User Guide

Wireless LAN Access Point 7250

3CRWE725075
(Model WL-455)

http://www.3com.com/
http://www.3com.com/support/en_US/productreg/frontpg

Part No. DUA72507-5AAA01
Published April 2005

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Marlborough, MA
01752-3064

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Contents

1 Introduction

Product Features....1
Security....1
Performance and Reliability....2
Virtual Access Point (VAP) Support....2
WDS Bridging and Spanning Tree Protocol (STP) Support....3
Manageability....4
802.11g Wireless Network Standard....4
Standard Network Configuration and Planning....5
Ad Hoc Wireless LAN....5
Infrastructure Wireless LAN....5
Infrastructure Wireless LAN for Roaming Wireless PCs....6
Advanced Network Configuration and Planning....7
Public/Private Access Point Service....7
Terminology....8

2 Installing the Access Point

Installation Requirements....11
Power Requirements....12
Safety Information....12
Deciding Where to Place Equipment and Performing A Site Survey....13
Before You Begin....14
Connecting the Standard Antennas....15
Connecting Power....16
Using the Included AC Adapter....16
Using an Optional Power-Over Ethernet Injector....17
Using a Power-Over-Ethernet LAN Port....18
Checking the LEDs....18
Mounting on a Wall....18
Flat Surface Installation....20
Selecting and Connecting a Different Antenna Model....21
Power Settings on the Access Point for External Antennas....22

Installing Software Utilities....23

3 System Configuration

Using the 3Com Wireless Device Manager....25
Launching a Wireless Device Configuration....25
Using the Pre-IP Configuration Wizard....27
Configuration Login....27
Setting the Country Code....27
Basic Setup....28
Advanced Setup....29
Identification....29
TCP/IP Settings....29
DHCP Client....29
Web Servers....30
Smart Monitor....30
RADIUS....31
Authentication....33
Filter Control....36
Filtering by VLAN....36
Enabling VLAN Filtering....36
Security Filters....37
Client List Timeout....37
Uplink Port MAC Address Filtering....37
Filtering by Ethernet Protocol Type....38
SNMP....39
Trap Destination....39
Trap Configuration....40
SNMP Users....41
Default Groups....41
Default Security Levels....41
Groups....42
SNMP Targets....43
SNMP Filter....43
Administration....44
WDS/STP Settings....45
Configuration Guidelines....46
Radio Bridge Roles....46

Bridge Address Entry 46
Scanning for WDS Links 47
Configuring Spanning Tree Protocol Settings 47
System Log 48
Status 49
Radio Interface 50
Radio Settings 50
Virtual Access Point (VAP) Configuration 50
Enabling Virtual Access Point (VAP) 50
Changing Radio Settings 52
Security 54
Selecting a Virtual Access Point (VAP) 54
Configuring Authentication 54
Configuring Encryption 54
WPA Configuration 55
WEP Configuration 56
How to setup the access point for RADIUS authentication 57
How to setup the access point for WPA with 802.1x Session keys 58
How to setup the access point for WPA with Pre-Shared (PSK) Key 59
WPA Configuration for Windows XP 60

4 Troubleshooting

Regulatory Compliance Information

Index

1 INTRODUCTION

The 3Com® Wireless LAN Access Point 7250 supports 802.11g and 802.11b wireless users.

With their flexibility and unfettered access, wireless LANs are changing the way people work. Now with 3Com's enterprise-class wireless access points, you can build a cost-effective, reliable, secure wireless network that provides users with seamless connectivity to the Internet, company intranet, and the wired corporate network from anywhere they happen to be—conference room, cafeteria or office.

Industry-leading security features and comprehensive management and performance features combine to make these enterprise class wireless access points an ideal choice for organizations ready to serve their increasingly mobile workforce.

PRODUCT FEATURES

The single wireless interface 802.11g 2.4 GHz, 54 Mbps access point creates an enterprise-class wireless LAN supporting up to 250 simultaneous users.

SECURITY

3Com offers one of the most robust suite of standards-based security on the market today.

To protect sensitive data broadcast over the wireless LAN, 3Com supports the Advanced Encryption Standard (AES). 3Com strengthens this basic security mechanism with additional security features, including:

- MAC address access control lists
- IEEE 802.1x per-port user authentication with RADIUS server authentication support
- IEEE 802.1x supplicant support

- SSH v2
- HTTP/HTTPS
- SNMP v3
- Temporal Key Integrity Protocol (TKIP)
- Legacy WEP 40/64 bit, 128 bit and 152 bit
- Wireless Protected Access (WPA)
- Extensible Authentication Protocol (EAP) support: EAP-MD5, EAP-TLS, EAP-TTLS, and PEAP

Performance and Reliability

3Com wireless access point performance features ensure reliable and seamless connections for users wherever they roam:

- Automatic channel selection automatically finds the least loaded channel for interference-free communication.
- Auto network connect and dynamic rate shifting keep users connected through a wide variety of conditions by changing to the optimum connection speed as they move through the network.
- Virtual Access Point (VAP) support provides flexibility by allowing a single access point radio to operate as two separate access points.
- Wireless Distribution System (WDS) Bridging support allows you to create large wireless networks in areas where pulling wires is restricted or cost-prohibitive by linking several wireless access points together with WDS links.

Virtual Access Point (VAP) Support

Virtual Access Point (VAP) support allows an access point radio to operate as two separate access points, providing multiple wireless services to clients in a network. Each VAP can be configured to provide access to different network resources and can support different levels of security.

For example, in a university network, an AP could be used to offer two services: The first service provides access to protected data for authenticated university staff members, while the second service provides open access to the Internet for unauthenticated users, such as students or visitors.

Two VAPs per radio are available, and each VAP can be configured with its own security settings.

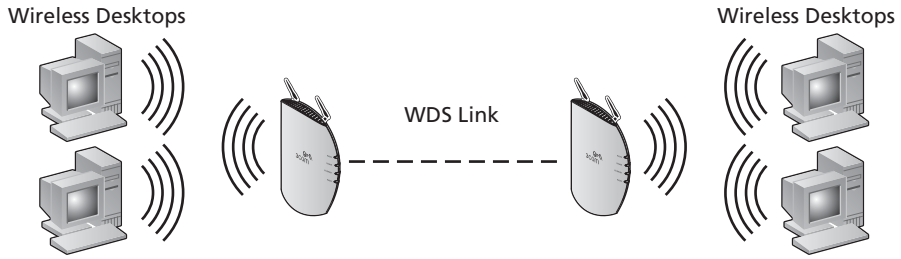
For information on setting up and configuring VAPs, see "Enabling Virtual Access Point (VAP)" on page 50.

WDS Bridging and Spanning Tree Protocol (STP) Support

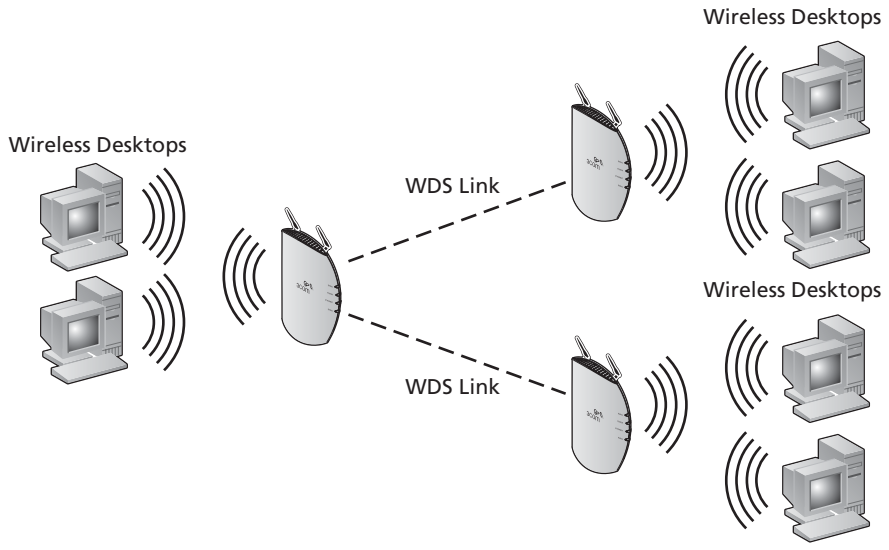
A Distribution System (DS) is a network (typically a wired network) that interconnects separate access points into a single LAN. With WDS, the interconnection no longer needs to be physically wired. WDS uses the wireless medium to interconnect separate access points, thereby eliminating the cost and inconvenience that may hinder wire installations.

A WDS link can be used in a simple point-to-point link, a complex point-to-multipoint link, or a multilayer topology.

Point-to-Point WDS Link. The following example shows a point-to-point WDS link configured between two access points.



Point-to-Multipoint WDS Link. The following example shows point-to-multipoint WDS links configured between multiple access points.



Additionally, Spanning Tree Protocol (STP) support prevents loops from being formed on the network. For more information on these items, see the *Wireless LAN Access Points User Guide*.

For WDS and STP configuration instructions, see "WDS/STP Settings" on page 45.

MANAGEABILITY

3Com offers a wide range of standards-based management support, from SNMP to 3Com Network Supervisor and HP OpenView for seamless integration with your wired network.

Wireless Infrastructure Device Manager and Wireless LAN Device Discovery tools let you configure parameters, run diagnostics, backup and restore configurations, and monitor performance from anywhere on the network using an embedded web server browser. You can also update wireless device software on multiple devices using 3Com Network Supervisor to simplify bulk updates.

With Power over Ethernet (PoE) support, the same Category 5 cable that connects your access point to the data network also provides its power. A single cable installation dramatically improves your choice of mounting configurations because you no longer need to consider AC power outlet locations. PoE support makes it easier than ever to overcome installation problems with difficult-to-wire or hard-to-reach locations.

802.11G WIRELESS NETWORK STANDARD

802.11g operates in the 2.4 GHz band at up to 54Mbps, and supports the widest coverage—up to 100 meters (328 feet). However, is subject to a greater risk of radio interference because it operates in the more popular 2.4 GHz band.

Consider 802.11g when you need wider coverage and vendor compatibility and you are:

- Maintaining support for existing 802.11b users and the existing wireless investment while providing for expansion into 802.11g.
- Implementing a complete wireless LAN solution, including bridges, gateways, access points and clients; Wi-Fi certification guarantees compatibility among vendors
- Providing access to hot spots in public spaces such as coffee shops or university cafeterias

STANDARD NETWORK CONFIGURATION AND PLANNING

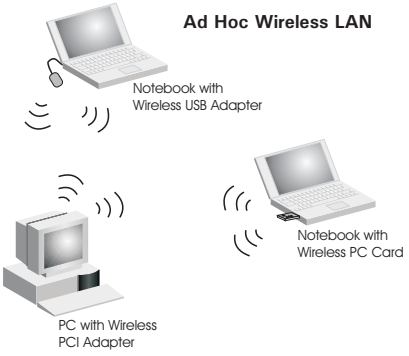
The wireless solution supports a stand-alone wireless network configuration as well as an integrated configuration with 10/100 Mbps Ethernet LANs.

The wireless network cards, adapters, and access point can be configured as:

- Ad hoc for departmental or SOHO LAN
- Infrastructure for wireless LAN
- Infrastructure wireless LAN for roaming wireless PCs

AD HOC WIRELESS LAN

An ad hoc wireless LAN consists of a group of computers, each equipped with a wireless adapter, connected via radio signals as an independent wireless LAN. Computers in a specific ad hoc wireless LAN must therefore be configured to the same radio channel. An ad hoc wireless LAN can be used for a branch office or SOHO operation.

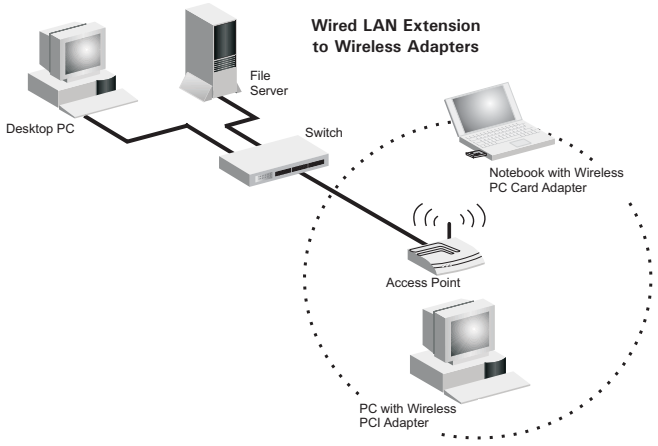


INFRASTRUCTURE WIRELESS LAN

The access point can also provide access to a wired LAN for wireless workstations. An integrated wired/wireless LAN is called an infrastructure configuration. A Basic Service Set (BSS) consists of a group of wireless PC users, and an access point that is directly connected to the wired LAN. Each wireless PC in this BSS can talk to any computer in its wireless group via a radio link, or access other computers or network resources in the wired LAN infrastructure via the access point.

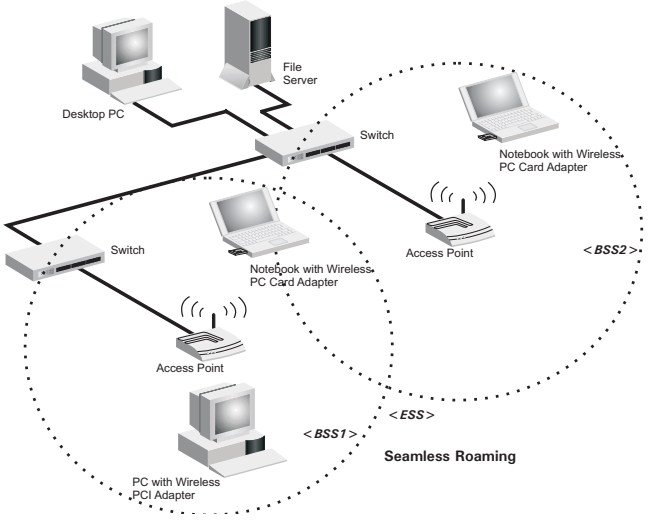
The infrastructure configuration not only extends the accessibility of wireless PCs to the wired LAN, but also increases the effective wireless transmission range for wireless PCs by passing their signal through one or more access points.

A wireless infrastructure can be used for access to a central database, or for connection between mobile workers, as shown in the following figure.



INFRASTRUCTURE WIRELESS LAN FOR ROAMING WIRELESS PCS

The Basic Service Set (BSS) is the communications domain for each access point. For wireless PCs that do not need to support roaming, set the domain identifier (SSID) for the wireless card to the SSID of the access point to which you want to connect. A wireless infrastructure can also support roaming for mobile workers. More than one access point can be configured to create an Extended Service Set (ESS). By placing the access points so that a continuous coverage area is created, wireless users within this ESS can roam freely.



Advanced Network Configuration and Planning

Virtual Access Point (VAP) and WDS Bridging capabilities allow the access point to be integrated into many new network configurations. Some common configurations are explained briefly in this section:

- Public/private access point service
- Remote building wireless access with the AP8250 and 802.11a Bridging Kit
- Remote building wireless access with the AP8250 and 802.11g Upgrade Kit

Public/Private Access Point Service

The public/private access point service configuration allows the access point to provide public Internet access while simultaneously providing secure access to the enterprise network.

In this configuration, an AP7250 access point is configured with two Virtual Access Points:

- The first Virtual Access Point is configured to support one SSID that is broadcast with no security.
- The second Virtual Access Point is configured with a different, private SSID that is not broadcast.

  The private SSID should be assigned to a separate VLAN and use 802.1x authentication with either TKIP or AES encryption to a RADIUS server.

TERMINOLOGY

Access Point—An internetworking device that seamlessly connects wired and wireless networks.

Ad Hoc—An ad hoc wireless LAN is a group of computers, each with LAN adapters, connected as an independent wireless LAN.

Backbone—The core infrastructure of a network. The portion of the network that transports information from one central location to another central location where it is unloaded onto a local system.

Base Station—In mobile telecommunications, a base station is the central radio transmitter/receiver that maintains communications with the mobile radiotelephone sets within its range. In cellular and personal communications applications, each cell or micro-cell has its own base station; each base station in turn is interconnected with other cells' bases.

BSS—Basic Service Set. It is an access point and all the LAN PCs that are associated with it.

CSMA/CA—Carrier Sense Multiple Access with Collision Avoidance.

EAP—Extensible Authentication Protocol, which provides a generalized framework for several different authentication methods.

ESS—Extended Service Set. More than one BSS is configured to become an ESS. LAN mobile users can roam between different BSSs in an ESS (ESS-ID, SSID).

Ethernet—A popular local area data communications network, which accepts transmission from computers and terminals.

Infrastructure—An integrated wireless and wired LAN is called an infrastructure configuration.

RADIUS—Remote Access Dial-In User Server is an authentication method used in conjunction with EAP for 802.1x authentication and session based keys.

Roaming—A wireless LAN mobile user moves around an ESS and maintains a continuous connection to the infrastructure network.

RTS Threshold—Transmitters contending for the medium may not be aware of each other (they are "hidden nodes"). The RTS/CTS mechanism can solve this problem. If the packet size is smaller than the preset RTS Threshold size, the RTS/CTS mechanism will not be enabled.

VAP—Virtual Access Point. An access point radio capable of operating as two separate access points.

VLAN—Virtual Local Area Network. A LAN consisting of groups of hosts that are on physically different segments but that communicate as though they were on the same segment.

WEP—Wired Equivalent Privacy is based on the use of security keys and the popular RC4 encryption algorithm. Wireless devices without a valid WEP key will be excluded from network traffic.

WDS—Wireless Distribution System.

WPA—Wi-Fi Protected Access.

2 INSTALLING THE ACCESS POINT

This equipment must be installed in compliance with local and national building codes, regulatory restrictions, and FCC rules. For the safety of people and equipment, this product must be installed by a professional technician/installer.

***CAUTION**: Before installing, see the important warnings and cautions in "Safety Information" on page 12.*

INSTALLATION REQUIREMENTS

The following items are required for installation:

- Access Point 7250
- Standard detachable antennas
- 3Com installation CD.
- Wall-mount installation hardware (supplied): mounting plate, mounting screws, and plastic anchors for drywall mounting.
- If you do not have IEEE 802.3af power-over-Ethernet LAN equipment, use the 3Com Integrated Power-over-Ethernet power supply that comes with the access point.

  If your LAN equipment complies with the IEEE 802.3af power-over-Ethernet standard, you can connect directly to the equipment, and the 3Com power supply is not needed.
- Standard category 5 straight (8-wire) Ethernet cable.

  The cable must be long enough to reach the power supply or the power-over-Ethernet LAN port.

  If you use the 3Com power supply, you need an additional Ethernet cable to connect the access point to the LAN.

- To access and use the Web configuration management system, you need a computer that is running Internet Explorer 5.0 or newer and one of the following operating systems: Windows 98, Windows ME, Windows NT 4.0 Service Pack 6, Windows 2000, or Windows XP. It is recommended that this computer become the dedicated workstation for managing and configuring the access point and the wireless network.

POWER REQUIREMENTS

The access point complies with the IEEE 802.3af power-over-Ethernet standard. It receives power over standard category 5 straight (8-wire) Ethernet cable. Installation requires the use of either the 3Com power supply provided or IEEE 802.3af compliant power supply equipment (output power rated 48 V dc @ 350 mA maximum). Such equipment must be safety certified according to UL, CSA, IEC or other applicable national or international safety requirements for the country of use. All references to the power supply in this document refer to equipment that meets these requirements.

Because the power supply plug is the only means of disconnecting the access point from power, make sure the power outlet is accessible.

See "Using an Optional Power-Over Ethernet Injector" on page 17 and "Using a Power-Over-Ethernet LAN Port" on page 18.

Note *for use of the 3Com power supply (part number 61-0107-000) in Norway: This product is also designed for use on an IT power system with phase-to-phase voltage of 230 V.*

SAFETY INFORMATION

This equipment must be installed in compliance with local and national building codes, regulatory restrictions, and FCC rules. For the safety of people and equipment, only professional network personnel should install the access point, cables, and antennas.

CAUTION: *If you supply your own Ethernet cable for connecting power, be sure that it is category 5 straight-through (8-wire) cable that has not been altered in any way. Use of nonstandard cable could damage the access point.*

CAUTION: *To comply with FCC radio frequency (RF) exposure limits, a minimum body-to-antenna distance of 1 meter (3 feet) must be maintained when the access point is operational.*

CAUTION: *To avoid possible injury or damage to equipment, you must use either the provided power supply or IEEE 802.3af compliant power supply equipment that is safety certified according to UL, CSA, IEC, or other applicable national or international safety requirements for the country of use. All references to power supply in this document refer to equipment meeting these requirements.*

CAUTION: *The 3Com power supply input relies on a 16A rated building fuse or circuit protector for short circuit protection of the line to neutral conductors.*

CAUTION: *It is the responsibility of the installer to ensure that the Power-over-Ethernet (POE) power supply is properly connected. Connection to any other device, such as a standard Ethernet card or another POE supply, may result in permanent damage to equipment, electric shock, or fire. Refer to the installation instructions for proper installation.*

Deciding Where to Place Equipment and Performing A Site Survey

The access point is ideally designed for vertical installation on a wall surface, but can also be flat-surface mounted in an elevated location where it will not be disturbed. Ceiling installation is not recommended.

Whether you choose to mount the access point on a wall or place it on a flat surface, make sure to select a clean, dry location that is elevated enough to provide good reception and network coverage. Do not mount the access point on any type of metal surface. Do not install the access point in wet or dusty areas. The site should not be close to transformers, heavy-duty motors, fluorescent lights, microwave ovens, refrigerators or any other electrical equipment that can interfere with radio signals.

If you are connecting the access point to a wired network, the location must provide an Ethernet connection. You will need to run an Ethernet cable from the power supply to the access point.

An access point provides coverage at distances of up to 100 Meters (300 Feet). Signal loss can occur if metal, concrete, brick, walls, floors or other architectural barriers block transmission. If your location includes these kinds of obstructions, you may need to add additional access points to improve coverage

Configuring a wireless LAN can be as easy as placing a 3Com Wireless Access Point in a central area and making the necessary connections to the AP and the clients. However, installing multiple Access Points may require more planning. Using the 3Com Site Survey tool (located on the installation CD) can help you determine if your wireless LAN connectivity and throughput is adequate and all users are covered by an Access Point.

If you plan to use an optional antenna instead of the standard detachable antennas that are supplied, review "Selecting and Connecting a Different Antenna Model" on page 21 before selecting the final location and be sure to allow for routing the antenna cable as required.

For optimal performance, ensure the access point operates in temperature ranges between –10° C to 40° C (14° F to 104° F).

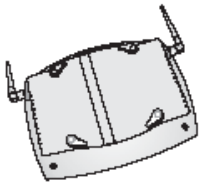
Caution: *Regulatory restrictions dictate that when this device is operational, the minimal body-to-antenna distance is 1 Meter (3 Feet).*

Before You Begin

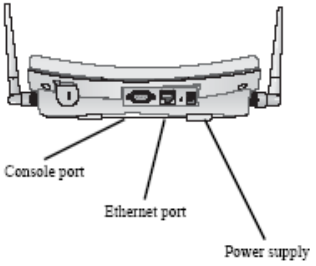
Record the access point MAC address in a safe place before the access point is installed in a hard-to-reach location. The MAC address is printed on the back of the access point housing.

The following illustration shows the front and rear views of the access point, including the LEDs and connecting ports.

Access Point 7250 - Front



Access Point 7250 - Back



Caution: *Do not connect a telephone cable into the Console port; doing so can cause serious damage to the access point.*

CONNECTING THE STANDARD ANTENNAS

The Access Point 7250 is supplied with standard detachable antennas. These should be attached before the access point is installed. If using an alternate antenna, see "Selecting and Connecting a Different Antenna Model" on page 21.

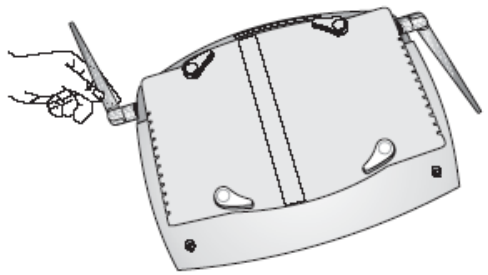
1 Carefully unpack the standard detachable antennas.

CAUTION: *Do not handle the antenna tips, especially after they are connected to the access point, as this could lead to electrostatic discharge (ESD), which could damage the equipment.*

2 Screw an antenna into each of the sockets in the access point housing.

3 Hand-tighten the antennas at the very base of the SMA connectors without handling the antenna tips.

4 Position the antennas so they turn out and away from the access point at a 45-degree angle. After network startup, you may need to adjust the antennas to fine-tune coverage in your area.



Depending on the coverage required for your site, you may want to replace the standard detachable antennas with one of the external antennas available for use with the access point. See "Selecting and Connecting a Different Antenna Model" on page 21.

CONNECTING POWER

It is advisable to connect the power and check the Ethernet cables and LEDs before installing the unit in a hard-to-reach location.

The access point complies with the IEEE 802.3af power-over-Ethernet standard. It receives power over a standard category 5 straight (8-wire) Ethernet cable.

There are three ways to supply power to the access point:

- Use the AC adapter included with the Access Point 7250.
- Use the 3Com Integrated Power-over-Ethernet power supply. In this case, you need to supply a second Ethernet cable to connect to the wired LAN.
- Connect the access point directly to your own power-over-Ethernet hub or switch, which must also comply with the IEEE 802.3af standard.

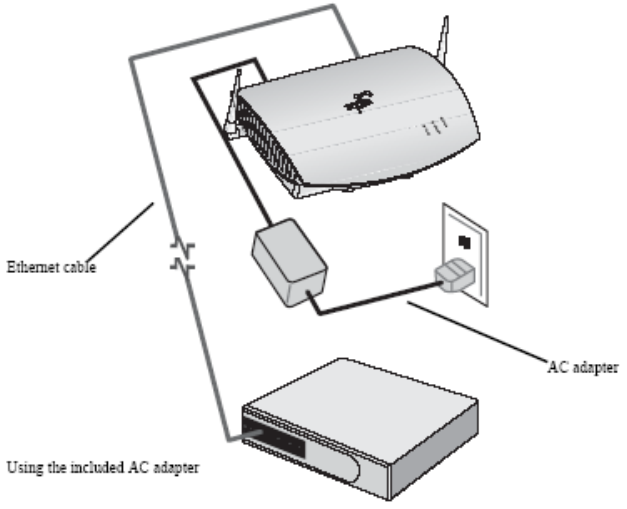
  If you supply your own Ethernet cable for connecting power, be sure that it is standard category 5 straight-through (8-wire) cable that has not been altered in any way. Use of nonstandard cable could damage the access point.

USING THE INCLUDED AC ADAPTER

The power supply included with the Access Point 7250 is an AC adapter.

1 Connect the power cord to the AC adapter and plug the cord into a power outlet.

2 Connect the DC power into the Access Point 7250.



Using an Optional Power-Over Ethernet Injector

CAUTION: *To avoid damaging network equipment, make sure that the cables are connected from access point to power supply to LAN as shown above and described below.*

The Power-Over-Ethernet Injector can be located at any point between the access point and the LAN access port, wherever a convenient power outlet exists. If you supply your own Ethernet cable for connecting power, be sure that it is standard category 5 straight-through (8-wire) cable that has not been altered in any way. Use of nonstandard cable could damage the access point.

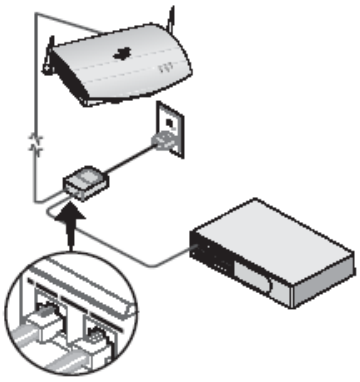
Refer to the illustration below, and follow these steps:

1 Connect one end of the Ethernet cable to the Ethernet port on the access point.

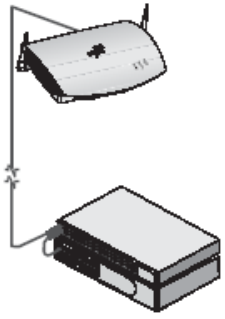
2 Connect the other end of the Ethernet cable to the port labeled *To Access Point* on the power supply.

3 Connect the power cord to the power supply and plug the cord into a power outlet.

4 To link the access point to your Ethernet network, plug one end of another Ethernet cable into the port labeled To *Hub/Switch* on the power supply, and plug the other end into a LAN port (on a hub or in a wall).



Using an Optional Power-over-Ethernet Injector



Using an Optional Power-over-Ethernet LAN Port

Using a Power-Over-Ethernet LAN Port

If your LAN equipment complies with the IEEE 802.3af power-over-Ethernet standard, you can connect the access point directly to a LAN port. For example, the illustration above right shows a connection through a 3Com Ethernet Power Supply to a 3Com SuperStack® Switch.

Checking the LEDs

When power is connected, the access point LEDs light. The illustration and the following table describe the LEDs and their functions.

Name	Description
Radio	LED blinks red to indicate radio activity. Faster blinking indicates more activity.
Ethernet	LED lights yellow when a 10 Mbps Ethernet link is established. LED lights green when a 100 Mbps Ethernet link is established. LED blinks to indicate activity on the Ethernet. Faster blinking indicates more activity.
Power	LED lights green when operational code is running.

Mounting on a Wall

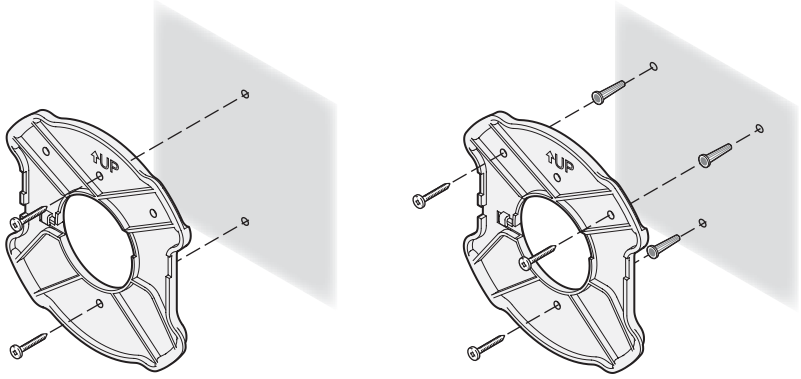
CAUTION: *The mounting plate is designed for wall mount installation only. To avoid equipment damage and possible injury, do not use the mounting plate for a ceiling installation.*

The access point comes equipped with all the necessary hardware for mounting on a wall, including a mounting plate. For a secure installation, the mounting plate should be placed perpendicular to the floor, with the arrow pointed up, as indicated on the mounting plate, with the smooth side against the wall.

1 Install the mounting plate as shown in the following illustration, on either a stud (or other hard wall surface), or onto drywall.

If installing into a stud or other secure vertical surface, use 2 screws.

If installing into drywall, use 3 plastic anchors and 3 screws.

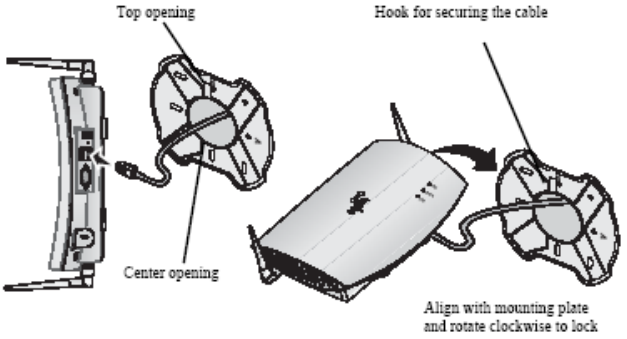


- Allow for a clearance of at least 25 cm (10 Inches) between the ceiling and the top of the mounting plate.
- Orient the bracket with the letter "B" at the top of the bracket.
- For installation on a wall stud, install the top screw into the stud, as shown at left in the illustration, and then vertically align the mounting plate before installing the bottom screw.
- For installation on to drywall, mark three screw holes using the mounting plate as a template for vertical alignment, as shown at right in the illustration above.
- Use a 5-mm (3/16-in.) drill bit if using the plastic anchors provided.
- For drywall mounts, you can route the cable through either a side or center opening for a seamless appearance using one of the methods illustrated below. Alternatively, you can simply attach the Ethernet cable to the side of the unit, allowing it to trail along the wall.
- If you have routed the Ethernet cable through the center opening, secure the cable on the hook located on the mounting plate as shown in the illustration below.

2 Connect the Ethernet cable to the Ethernet port on the access point.

3 Connect the power cable to power port on the rear panel of the access point.

4 Position the access point at an angle to the mounting plate bayonet connection and turn the unit clockwise until it snaps into place, as shown below.



FLAT SURFACE INSTALLATION

The access point can also be placed on a flat surface such as a table, desktop or filing cabinet. Do not install the access point on any type of metal surface. If you choose a flat surface mount, select a location that is clear of obstructions and provides good reception.

Connect Ethernet cable

Rotate antennas for best reception

***Note**: Regulatory restrictions dictate that when this device is operational, the minimal body-to-antenna distance is 1 Meter (3 Feet).*

Selecting and Connecting a Different Antenna Model

***Important Note**: For FCC regulatory compliance reasons, in the United States, Canada, and other countries governed by FCC guidelines, external antennas can only be used in an access point operating temperature range of 15° C - 40° C (59° F - 104° F)*

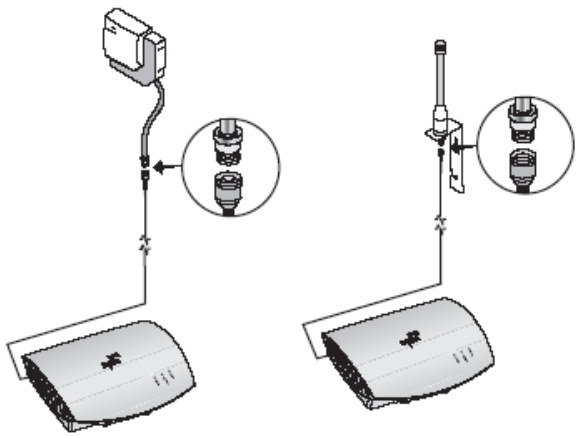
If the access point is used with an external antenna, you must also purchase an antenna cable. For maximum efficiency, use the shortest antenna cable possible. Antenna cables induce signal loss, which will limit the radiated power output and range of the access point. Of the options available, we recommend the 3Com 6-foot Antenna Cable (3CSE480).

The standard detachable antennas supplied with the Access Point 7250 are suitable for a broad variety of environments. If you require a different type of antenna for the Access Point 7250, several options are available by model number from the 3Com Web site (www.3Com.com).

For each of the antenna models, you will need either a 6-foot accessory cable (model 3CWE480) or a 20-foot accessory cable (model 3CWE481) to provide the transition from the SMA connector on the access point to the N-type connector on the antenna.

To ensure the physical safety of anyone near the antenna and to prevent damage to the access point, follow the building codes for antenna installations in your area.

Antennas can be connected to either side of the access point after the standard detachable antennas have been removed, as shown below.



1. Position the antenna so that there are minimal obstacles between it and any client with which it will communicate. While maintaining a direct line of sight between the antenna and a client is not strictly necessary, such an arrangement helps to ensure a strong signal. Ensure that access is available for routing the antenna cable from the antenna to the access point.
2. If they are installed, remove both arms of the standard detachable antenna, making sure not to handle the tips of the antenna.
3. Connect one end of the optional antenna cable to the antenna and secure the antenna in place.
4. Connect the free end of the antenna cable to the right-hand side connection on the access point, as shown in the illustration above.
5. Make certain that the antennas and antenna masts are appropriately grounded to prevent injury or damage from lightning strikes. Proper grounding for outdoor installations may require the purchase of a third-party lightning arrestor.

Power Settings on the Access Point for External Antennas

USA

	2.5dBi (3CWE492)	4dBi (3CWE490, 3CWE497)	8dBi (3CWE491, 3CWE498)
6 ft (3CWE580)	100%	100%	100%
20ft (3CWE581)	100%	100%	100%
50 ft (3CWE582)	100%	100%	100%

European Community

	2.5dBi (3CWE492)	4dBi (3CWE490, 3CWE497)	8dBi (3CWE491, 3CWE498)	13dBi (3CWE495)
6 ft (3CWE580)	100%	100%	25%	12.5%
20ft (3CWE581)	100%	100%	100%	25%
50 ft (3CWE582)	100%	100%	100%	100%

INSTALLING SOFTWARE UTILITIES

The installation CD includes documentation and software utilities to help you set up and administer the wireless components of your network.

To view product documentation, select *View the Documentation* from the CD Startup Menu and then select the item you wish to view.

The software Tools and Utilities include:

- **3Com Wireless Infrastructure Device Manager.** Use this tool to discover access points and select devices for administrative changes.
- **3Com 3CDaemon Server Tool.** This tool can act in four different capacities:
  - As a TFTP Server, necessary for firmware upgrades, and backup and restore functions. Use this option if you do not have a TFTP server set up.
  - As a SysLog Server, which is necessary to view SysLog messages.
  - As an optional TFTP Client.
  - As an optional FTP Server.
- **3Com Network Supervisor.** Click this link to download the 3Com Network Supervisor (3NS). The 3Com 3NS graphically discovers, maps, and displays network links and IP devices, including 3Com wireless access points. It is not required for access point management.
- **3Com Site Survey Tool**. This utility assists in selecting the best location for your access point before installing the device permanently. Use the Site Survey Tool to determine if the intended mounting locations will provide adequate coverage with good signal strength and quality.
- **Internet Explorer**. Click this link to download Internet Explorer.

To install a tool from the CD:

1. Power up the computer and put the 3Com CD in the CD-ROM drive.
2. The setup menu should appear when the CD autostarts. If no menu appears, you can run the setup.exe startup program from the Windows Start menu. For example, if your CD drive is the D drive: Start / Run / d:setup.exe.
3. From the CD startup menu, select *Tools and Utilities*.
4. Select the item you want to install and follow the instructions on the screen.

3 SYSTEM CONFIGURATION

The access point can be configured using a Web browser that has Java support (Internet Explorer 5.0 or newer). Using the Web management interface, you can configure the access point and view statistics to monitor network activity.

The 3Com Wireless Infrastructure Device Manager helps you locate 3Com wireless LAN devices on the network, select a device and view its properties, and launch the device's configuration interface in your Web browser. To configure a device, the device manager must be installed on a computer that has an Ethernet adapter and is running a supported Windows operating system and Web browser.

USING THE 3COM WIRELESS DEVICE MANAGER

After the 3Com Wireless Device Manager is installed, ensure that the device to be configured is either wired to the network, associating with the wireless network, or connected directly to the computer, and connected to power. If more than one device using the factory default name is connected, make a note of the MAC address of the device you want to select so that you can identify it in the device manager.

LAUNCHING A WIRELESS DEVICE CONFIGURATION

If you do not have a DHCP server on your network, it can take up to one minute for a device to become discoverable after it has been powered up.

1 To launch the 3Com Device Manager, select *Start /Programs /3Com Wireless/Wireless Infrastructure Device Manager*.

If you have more than one network adapter installed on your computer, you may be prompted to choose a network adapter. Choose the appropriate adapter and click *OK*.

The Wireless Network Tree appears in the 3Com Wireless Infrastructure Device Manager window.

The tree lists all WLAN service areas on the network and expands to show the 3Com wireless LAN devices that are associated to each service area. Devices in a different subnet than your computer are identified with exclamation points (!). You can refresh this display by clicking *Refresh*. You should refresh the display, for example, after you change a device IP address.

2 In the Wireless Network Tree, select the device you want to configure.

If more than one wireless LAN device appears in the tree, click *Properties* and check the MAC address to verify that it is the one you want.

3 Click *Configure*.

- If the selected device is on the same subnet as your computer, the configuration management system main page appears in your Web browser. (If a password is set on the device, enter it when prompted.)
- If the selected device is on a different subnet, the Pre-IP Configuration Wizard is activated automatically. This wizard lets you configure the IP settings for the selected wireless device. It proposes IP address and subnet mask settings derived from your computer's settings, so the selected device will then reside on the same subnet as your computer. You can accept the suggested settings or change them as required. For more information, see "Using the Pre-IP Configuration Wizard" on page 27.

The next window prompts for an administrative password to allow the new IP address to be set. When the units are shipped from the factory, there is no administration password and you should leave the password field blank. If an administration password has been set for the device, enter the password and click *Next*. The 3Com Web Configuration Management System main screen appears in your Web browser.

The following table describes the buttons in the 3Com Device Manager.

Button	Description
Properties	Displays the following for the selected device: Device Name, Device Type, Wireless LAN Service Area (ESSID), IP Address, Subnet Mask, and MAC Address.
Configure	Launches the configuration interface for the selected device. If the selected device is on a different subnet, you are prompted to assign an address on the same subnet as your computer.
Refresh	Scans the network and displays the connected 3Com Wireless LAN devices.
Choose NIC	Allows you to choose which card you want to use.
Close	Closes the device manager window and ends the session.
Help	Launches the device manager help page in your browser.

Using the Pre-IP Configuration Wizard

You can only configure devices that are on the same subnet as your computer. To configure a device on a different subnet, you must first assign it an IP address on the same subnet as your computer. After you launch the configuration, you can change settings as usual. Just before you finish, you must change the device IP address back to its original setting. Follow this procedure:

1. In the Wireless Infrastructure Device Pre-IP Configuration window, accept the suggested settings or change them as required. You can assign a static IP address or specify that the device obtain its IP address from a DHCP server.
2. The next window prompts for an administrative password. When the units are shipped from the factory, there is no administration password and you should leave the password field blank. If an administration password has been set for the device, enter the password and click *Next*. The Configuration Management System main page appears in the Web browser.

Configuration Login

After you launch the configuration from the device manager, the login page appears in your browser.

- The default username is: admin
- The default password is: no password

For an initial configuration, enter the default username and click *LOGIN.* Then set the Country Code as described below.

Setting the Country Code

The Country Code determines the available channels and transmission power level based on regulatory restrictions in the country where the access point is installed. The first time you log in, you must set the Country Code.

To ensure compliance with local regulations, be sure to select the country in which the access point is installed.

In the Country Code page, select the country from the pull-down list and click *Apply.* The configuration interface Home page appears.

BASIC SETUP

For a basic configuration, use the Setup Wizard as described below.

At any time, you can click Home to return to the Home page of the configuration interface. If you want to configure more advanced features, click Advanced Setup in the Home page.

1 In the Home page, click *Setup Wizard.*

2 In the "1-2-3" Setup Wizard page, select a Virtual Access Point (VAP) you want to set up, and then click *Next* to start basic configuration.

3 In the SSID page, enter the same Service Set ID as the other wireless devices in your network and click *Next.* (The SSID may be up to 32 alphanumeric characters and is case sensitive.)

4 In the Channel page, select the channel options for the access point radios and click *Next.* The channel options are:

802.11g—You can select from these options:

- Turbo Mode—In some countries you can use Turbo Mode. If Turbo Mode is not allowed in your country, this option is not available.
- 802.11g Radio Channel—Set the operating radio channel number.
- Auto Channel Select—When this mode is enabled, the access point selects a radio channel automatically.

5 In the TCP/IP Settings page, you can choose whether the access point obtains its IP address from a DHCP server or uses a static IP address. Configure the DHCP Client settings and click *Next.*

6 In the Security page, make selections and click *Next.*

For details on security settings, see "Security" on page 54.

7 Click *Finish.*

8 Click *OK* to restart the access point.

ADVANCED SETUP

The Advanced Setup pages allow you to configure features that are not available in the basic Setup Wizard. On the Home page, click *Advanced Setup* to open the Advanced Setup menu.

After making selections and entering data on each page, click *Apply* to save the changes. The following sections describe the Advanced Setup pages.

IDENTIFICATION

On the Identification page, you can identify the access point by providing a descriptive name. This name then appears in the device manager window. Enter a maximum of 32 alphanumeric characters in the System Name field and click *Apply.*

TCP/IP SETTINGS

On the TCP/IP Settings page, you can configure TCP/IP (Transmission Control Protocol/Internet Protocol) settings as described below. When you are finished configuring items on this page, click *Apply.*

DHCP CLIENT

When DHCP (Dynamic Host Configuration Protocol) Client is enabled, and a DHCP server is located on the network, the network DHCP server assigns the IP address, subnet mask and default gateway to the access point.

If there is no DHCP server on the network, the access point automatically uses its default IP address, 169.254.*2.1.*

When DHCP Client is disabled, you can specify the IP setup as follows:

- **IP Address** and **Subnet Mask**—If you configure an IP address and subnet mask, you must configure the network settings of the computers on your wireless LAN to use the same subnet mask. The IP addresses specified must be valid on the same subnet.
- **Default Gateway**—The default gateway address is optional, but may be required by your Internet Service Provider.
- **Primary DNS Address** and **Secondary DNS Address**—The Domain Name Servers (DNS) map numerical IP addresses to the equivalent domain name (for example, www.3Com.com). Your internet service provider should provide the IP address of one or more domain name servers. Enter those addresses in Primary DNS Address and Secondary DNS Address fields.

WEB SERVERS

This option controls whether the web management interface is enabled. There are two protocols available for web server connection:

- **HTTP**—Sends data unencrypted over the network.
- **HTTPS**—Uses Secure Socket Layer (SSL) technology to encrypt information between the access point and the web browser.

  By default, both protocols are enabled.

  Note: *To make a secure connection to the access point using HTTPS, you must specify* **`https://`** *in the browser window address pane when launching the configuration.*

- **HTTP Server**—Enable or disable the HTTP protocol, allowing connection to the access point management interface using unencrypted HTTP.
- **HTTP Port**—If HTTP Server is enabled, enter the HTTP port number. This parameter determines the port number where the web server accepts HTTP connections. The default is 80. If you enter a number other than 80, you must also specify the port number in the browser window address pane (for example, **`http://ipaddress:portnumber`**). This number can be set between 1024 and 65535.
- **HTTPS Server**—Enable or disable the HTTPS protocol, allowing connection to the access point management interface using encrypted HTTPS.
- **HTTPS Port**—If HTTPS Server is enabled, enter the HTTPS port number. This parameter determines the port number where the web server accepts HTTPS connections. The default is 443. If you enter a number other than 443, you must also specify the port number in the browser window address pane (for example, https://ipaddress:portnumber). This number can be set between 1024 and 65535.

SMART MONITOR

When Smart Monitor is enabled, the access point actively monitors its Ethernet link to determine if it can provide network service to wireless clients.

If the Ethernet link is down (for example, the cable is unplugged), the access point shuts down all radios and denies any wireless connections until the Ethernet link is re-established.

Optionally, the access point may be configured to PING a target on the network to validate the Ethernet link.

- **Disable**—The access point does not monitor the wired network, and therefore, the radio interface does not shut down due to a broken Ethernet link. This is the default setting.
- **Enable**—The access point monitors the Ethernet link and shuts down radios if the link is broken.
- **Host PING Enable**—When enabled, the access point periodically PINGs a target host on the network to determine the status of the Ethernet link. IP settings must be configured correctly for the PING to work. When disabled, only the physical Ethernet link is checked.
- Target IP Address—Enter the IP address of the reference check target. The target must be on the Ethernet network and may not be a wireless station.
- PING Interval—Enter the time interval (in milliseconds) between PINGs to the reference target, if enabled.
- Number of retries—This is the number of failed PINGs to the reference target that the access point will accept before if shuts down the radios.

RADIUS

The RADIUS page lets you define servers to be used for authentication and accounting.

RADIUS (Remote Access Dial-In User Service) is a login authentication protocol that uses software running on a central AAA (Access, Authentication, and Accounting) server to control access to RADIUS-compliant devices on the network. There are no special settings on the access point to distinguish between the various RADIUS policies or authentication types (for example EAP-MD5, EAP-TLS, EAP-TTLS). These policies are setup and controlled on the AAA server. Note that for most RADIUS software packages, the access point is actually called the "RADIUS client" and has a shared secret or secret key corresponding to the RADIUS setup page (see *KEY* parameter below).

The access point can send connection parameters to a RADIUS server, as well as statistics for accounting purposes. The access point is compatible with RFC2866 (the RADIUS Accounting specification).

Configuring a secondary RADIUS server provides a backup in case the primary server fails. The access point uses the secondary server if a failure is detected in the primary server. Once the access point switches over to the secondary authentication server, it periodically attempts to establish communication again with the primary authentication server. Once communication is established, the secondary authentication server reverts back to a backup server.

The access point uses the secondary accounting server if a failure is detected in the primary accounting server. It continues to use the secondary accounting server until it fails, in which case it returns to sending data to the primary accounting server.

In the RADIUS Authentication section, enter the required parameters for a primary and secondary RADIUS authentication server. When you are finished configuring items, click *Apply.*

The RADIUS Authentication parameters are described below.

- **IP Address**—The address of the server.
- **Port**—The network (UDP) port of the server used for messages. The port defaults to 1812 (1813 for RADIUS Accounting) and must match the port configured on the RADIUS server.
- **Key**—The encryption key is a shared ASCII string that is used to authenticate logon access for the client. The maximum length is 255 characters. Do not use blank spaces in the string. The key must be configured the same on both the access point and the RADIUS server. The Authentication and Accounting RADIUS servers can have different secret keys.
- **Timeout**—The number of seconds the access point waits for a reply from the RADIUS server before it resends the request.
- **Retransmit attempts**—The number of times the access point will try to authenticate logon access.
- **RADIUS Servers Assign Client VLAN ID in**—Select the VLAN ID format that matches your RADIUS server VLAN ID format.

In the RADIUS Accounting section, click the *Enable* radio button, then enter required parameters for a primary and secondary RADIUS accounting server. When you are finished configuring items, click *Apply.*

- **RADIUS Accounting Update Interval**—This is the interval in seconds between accounting updates sent to the RADIUS accounting server.
- **Accounting Log Options—**This option controls which clients generate accounting logs. If set to RADIUS Authenticated Clients Only, only those clients that successfully complete 802.1x Authentication will generate accounting logs. The default is for all authenticated clients to generate accounting logs.

AUTHENTICATION

The Authentication page allows you to configure the type of upper-layer authentication the access point uses for wireless clients. This authentication setup is applicable for **both** radio interfaces. Access is checked against the MAC Address authentication database stored on the access point.

NOTE: *This level of authentication occurs BEFORE any 802.1x authentication configured on the Security page. When using Local and RADIUS MAC Authentication, clients attempting to authenticate to the access point MUST pass these settings before any subsequent 802.1x authentication is attempted and verified. If no MAC address filtering is desired, leave this set to the default setting of Disable.*

Configure the options as described below. When you are finished, click *Apply.*

- **MAC Authentication**— Selecting MAC authentication allows you to define access permission and precedence. Options are:
  - **Local MAC**— With this option, the MAC address of the associating station is compared against the local access control list. You must build this list (called the MAC Authentication Table) as described in Local MAC Authentication below. Use this option if you want to restrict wireless clients authentication to the access point based off their MAC address.
  - **RADIUS MAC**— With this option, the MAC address of the associating station is sent to the configured RADIUS server for validation. You must specify the authentication sequence and the corresponding parameters for the remote authentication protocol. See "RADIUS" on page 31 and "802.1x Wireless Setup" below.
  - **Disable**— No MAC address related checks are performed on a client requesting authentication to the access point.
- **802.1x Wireless Setup**—802.1x is designed to enhance the security management of the wireless network. Select one of the following options:
  - **Disable**— The access point will neither initiate nor respond to any 802.1x authentication requests to or from wireless clients.
  - **Supported** — Legacy clients (non 802.1x) and 802.1x clients are both supported. This is provided for ease of migration. This option works with WPA key management set to either "WPA authentication over 802.1x" or "WPA pre-shared key (PSK)" on the radio security page.

- **Required** — Clients authenticate to a RADIUS server via the access point. Clients are not allowed onto the wired LAN until authentication is successful. If two Radios are installed and WPA is being used, both radios' security must be set to "WPA authentication over 802.1x" for the WPA key management when 802.1x is Required. If one radio's security is set to "WPA pre-shared key (PSK)" for WPA key management and the other is "WPA authentication over 802.1x", then the 802.1x Wireless Setup must be set to "Supported" instead.

When 802.1x is enabled, the broadcast and session key rotation intervals can also be configured. Set these values to force the periodic refresh of broadcast or session keys for each 802.1x client.

First set up the RADIUS authentication for the client on the RADIUS authentication server. (See "RADIUS" on page 31.) Select Supported or Required on the 802.1x Wireless Setup field above. Enter data as described in the following table.

Field	Default	Description
Broadcast Key Refresh Rate	0 (minutes)	Defines how long the RADIUS server will refresh the primary broadcast key.
Session Key Refresh Rate	0 (minutes)	Defines how long the RADIUS server will dynamically re-assign a session key to a connected client station.
802.1x Reauthentication Refresh Rate	0 (seconds)	Defines the time interval in which the Access Point forces a Reauthentication and subsequently re-issues a new session key.

- **802.1x Supplicant Setup**

  802.1x Supplicant provides the access point with the ability to authenticate itself to an 802.1x-enabled switch port. In an environment where network access is controlled via 802.1x, the supplicant makes it possible for the access point to connect to the wired network. The access point assumes the 802.1x authenticator role (if configured properly) after the supplicant has completed. The supplicant authentication method supported is EAP-MD5.

  - **Enable**—Select *Enable* to start the supplicant authentication process. The supplicant retries the authentication process until it has been successfully authenticated.
  - **Username**—Enter a username to be used for EAP-MD5 authentication.
  - **Password**—Enter a password to be used for EAP-MD5 authentication.
  - **Confirm Password**—Re-enter the password for EAP-MD5 authentication.

- **Local MAC Authentication**—Client computers can be filtered using the unique MAC addresses of their network cards.

  To build the MAC Authentication Table, enter a MAC address in the space provided, choose the permission, and click *Update.*

  MAC addresses are listed in the MAC Authentication Table in the order that they were entered. The Local MAC Authentication parameters are described in the following table:

Parameter	Description
System Default	Define the default filtering setting as Deny or Allow.
MAC Address	Enter the MAC address of a client for the access control. You can find the MAC address of a network card as follows: **Windows 95/98/ME**—Click *Start/Run.* Type winipcfg and press *Enter.* The MAC address is in the Adapter Address section. **Windows NT4/2000/XP**—At the command prompt, type ipconfig /all and press *Enter.* The MAC address is listed as the Physical Address. **Linux**—Run the command "/sbin/ipconfig." The card's MAC address is the value after the word "HWaddr."
Permission	Allows or denies access to the access point of devices matching the specified MAC address.
Update button	Click *Update* to refresh the MAC Authentication Table. To avoid the possibility of entering an invalid MAC address on the Authentication page, always click *Update* after typing the address. If you press *Enter,* address error checking does not occur.

FILTER CONTROL

The Filter Control page allows you to control client communication within the wireless network. You may enable one or more types of supported filtering; however, some filter choices may supersede others. Configure the options as described below. When you are finished, click *Apply.*

FILTERING BY VLAN

The access point supports filtering of up to 64 VLANs (virtual local area networks). VLAN IDs must be configured for each client on one of the RADIUS authentication servers specified on the RADIUS configuration page. If a RADIUS server is not being used or not setup to update the VLAN ID, then the access point will tag all ethernet packets with the Native VLAN ID (defaulted to 1).

If a RADIUS authentication server will be used to create/modify the VLAN ID, the following attributes must be provisioned on the RADIUS Server to be passed back to the authenticating client:

The AP's IP address is the RADIUS Client/Radius User

Tunnel_type (64) = VLAN (13)

Tunnel_Medium_type (65) = 802

Tunnel_Private_group_ID (81) = VLAN ID specified in Hexadecimal format.

VLAN Switch ports must be tagged ports that match the VLAN ID on the Access Point. Associated client VLAN IDs will appear in the Syslog file in ASCII Decimal format.

When VLAN filtering is enabled, the access point queries the server for the VLAN IDs of associating clients and saves the VLAN IDs. If a client does not have a VLAN ID, the access point assigns its own native VLAN ID to that client.

ENABLING VLAN FILTERING

To enable VLAN filtering, enter a VLAN ID (a number between 1 and 4095) in the *Management VLAN ID* field and select *VLAN Enable.*

When VLAN filtering is disabled, the access point ignores VLAN-tagged frames.

Security Filters

These options allow you to block communication among wireless clients (client-to-client blocking) and prevent wireless clients from performing access point administration.

- **Ethernet Broadcast Storm Control**—This option allows users to limit broadcast/multicast traffic coming from the Ethernet network. This feature allows wireless clients to communicate properly under a heavy broadcast environment.

  When enabled, the access point discards broadcast/multicast packets if the broadcast rate exceeds 180 packets per second or 30KB of data per second. Additionally, any single source of broadcast/multicast transmissions is limited to five packets per second or 8KB of data per second.

  Ethernet broadcast storm control improves wireless performance on networks that have high broadcast data rates. However, if the network requires high broadcast/multicast data rate transmissions (for example, a media streaming server) this feature should be disabled.
- **Local Bridge Filter**—Enable this filter to prevent direct communication between wireless clients, creating a more secure wireless network.
- **AP Management Filter**—Enable this filter to prevent wireless clients from accessing the access point for management; for example through TELNET or SNMP.

Client List Timeout

This option sets the timeout for inactive clients to be disassociated and removed from the associated client list. The interval can be set to 1, 5, 10, 30 or 60 minutes (default is 30 minutes).

Uplink Port MAC Address Filtering

This feature allows associated wireless clients to communicate only with specific selected MAC addresses on a sub net. By only allowing clients to communicate with a few specific servers such as DHCP server, a Gateway, or a local web server, clients are blocked from communicating with other clients on the local sub net, but are still allowed (via the gateway) to communicate with severs on the Internet.

Note: *In most cases client to client blocking should also be enabled as the Uplink Filter only works on packets coming into the AP from its Ethernet (uplink) port.*

For security reasons it is desirable to block client to client communications for wireless clients associated with an access point (AP). It is also desirable to block client to client communications between clients associated with different AP's on the local sub net. For instance an airport may have several AP's to service several "hot spots" within the airport. However the client to client blocking feature of the AP will only block communications to other clients associated with the same AP. And will not block client to client of another AP communications. By using the *Uplink Filtering* function of the AP communications to all other clients of all other AP's on the same sub net can be blocked.

It is important to note that this feature only works if all the AP's are on the same sub net. If an AP is located on the far side of the gateway (i.e. on a different sub net) its clients will NOT be blocked from communicating with clients on the local sub net of interest.

This feature is accessed on the Filter Page of the user interface. Click *Enabled* next to the Uplink Port MAC Address Filtering link and add up to eight MAC addresses that WILL be allowed to communicate with clients of the AP. Make sure to include the MAC of the local DHCP server, if it not the same as the gateway as well as and redirect gateways and other servers that should be allowed to communicate with the AP's wireless clients. Make sure to click on the save button on both the Uplink Filter List page as well as the Filter page to activate the function.

Filtering by Ethernet Protocol Type

Use the Ethernet Type Filter table to filter out Ethernet packet frames that match the Ethernet protocol type. Select *Ethernet Type Filter Enable,* then set the status of each Ethernet frame type in the list.

SNMP

Use the SNMP page to display and enter a community string for the Simple Network Management Protocol (SNMP). To communicate with the access point, the SNMP agent must first be enabled and the Network Management Station must submit a valid community string for authentication.

You can set up to four trap destinations, each configurable with the IP address and community string of the trap manager. Additionally, you can enable trap notification on a per-user basis. An SNMP filter can be defined on a subtree of the MIB, and then the filter can be applied to selected SNMP users (also called an SNMP target). The SNMP target includes the trap notification IP address, port number, SNMP user name, and the filter to be applied.

Select *Enable* next to SNMP and enter data into the fields as described below. When you are finished, click *Apply.*

- **Location**—Specifies the access point location.
- **Contact**—Sets the system location string that describes the system location. (Maximum length: 255 characters)
- **Community Name (Read Only)**—Specifies a community string with read-only access. Authorized management stations are able to retrieve MIB objects. (Maximum length: 23 characters)
- **Community Name (Read/Write)**—Specifies a community string with read-write access. Authorized management stations are able to both retrieve and modify MIB objects. (Maximum length: 23 characters)
- **Engine ID**—Specifies the name for the local or remote SNMP engine.

Trap Destination

- **Trap Destination 1**—Select *Enable* to set up a trap manager to receive these messages.
- **IP Address**—Fill in the IP address box for the trap manager that will receive these messages.
- **Community Name**—Fill in the community string box for the trap manager that will receive these messages. (Maximum length: 23 characters)
- **Trap Destination 2**—Select *Enable* to set up a second trap manager to receive these messages.
- **IP Address**—Fill in the IP address box for the second trap manager that will receive these messages.
- **Community Name**—Fill in the community string box for the second trap manager that will receive these messages. (Maximum length: 23 characters)

- **Trap Destination 3**—Select *Enable* to set up a third trap manager to receive these messages.
- **IP Address**—Fill in the IP address box for the third trap manager that will receive these messages.
- **Community Name**—Fill in the community string box for the third trap manager that will receive these messages. (Maximum length: 23 characters)
- **Trap Destination 4**—Select *Enable* to set up a fourth trap manager to receive these messages.
- **IP Address**—Fill in the IP address box for the fourth trap manager that will receive these messages.
- **Community Name**—Fill in the community string box for the third trap manager that will receive these messages. (Maximum length: 23 characters)

TRAP CONFIGURATION

Select the types of traps you want the access point to generate.

Trap	Description (When the Trap is Sent)
sysSystemUp	Sent when the access point is fully up and running.
sysSystemDown	Sent before the access point is about to reboot.
sysRadiusServerChanged	Sent when the RADIUS server has changed from *Primary* to *Secondary*, or *Secondary* to *Primary*.
dot11StationAssociation	Sent when a station successfully associates with the access point. The trap also includes the MAC address of the station that has associated.
dot11StationReAssociation	Sent when a station successfully reassociates with the access point. The trap also includes the MAC address of the station that has associated.
dot11StationAuthentication	Sent when a station successfully authenticates with the access point. The trap also includes the MAC address of the station that has associated.
dot11StationRequestFail	Sent when a station fails to associate, reassociate, or authenticate with the access point. The trap also includes the MAC address of the station and the reason code for the failure.
dot1xAuthFail	Sent when a station fails to authenticate with the RADIUS server. The trap also includes the MAC address of the station that failed to authenticate.
dot1InterfaceAGFail	Sent when the 802.11g wireless interface fails.

Trap	Description (When the Trap is Sent)
dot1xMacAddrAuthSuccess	Sent when a station successfully authenticates the MAC address with the RADIUS server. The trap also includes the MAC address of the station that has authenticated.
dot1xMacAddrAuthFail	Sent when a station fails to authenticate the MAC address with the RADIUS server. The trap also includes the MAC address of the station that failed to authenticate.
dot1xAuthNotInitiated	Sent when a station did not initiate 802.1x authentication with the RADIUS server. The trap also includes the MAC address of the station that failed to authenticate.
dot1xAuthSuccess	Sent when a station successfully authenticates with the RADIUS server. The trap also includes the MAC address of the station that has authenticated.
localMacAddrAuthSuccess	Sent when a station successfully authenticates the MAC address with the database stored locally within the access point. The trap also includes the MAC address of the station that has authenticated.
localMacAddrAuthFail	Sent when a station fails to authenticate the MAC address with the database s stored locally within the access point. The trap also includes the MAC address of the station that failed to authenticate.
sntpServerFail	Sent when the access point fails to get time from the configured SNTP server.

SNMP USERS

Security configuration is accomplished by managing groups and users. There are three default groups that correspond to three available security levels:

Default Groups

- RO (read-only) group
- RW Auth (read-write) group
- RWPriv (read-write) group

Default Security Levels

- NoAuthNoPriv (no authentication no privacy)
- AuthNoPriv (authentication, but no privacy)
- AuthPriv (both authentication and privacy)

Users can be created and placed into a group. There are two parameters to configure: authentication and privacy. The selected authentication and privacy policy must match the group security level. For example, if an SNMP user is configured for MD5 authentication and its group does not allow authentication, an error message appears.

Duplicate user names or group names is not allowed.

- **User**—Specifies the SNMP v3 security name. The security name represents the user in a format that is Security Model-independent.
- **Group**—Specifies the name of the group to which the SNMP v3 user is associated. Assigning users to different groups allows the users to have different access rights.
- **Auth Type**—The SNMP v3 authentication protocol.
- **Passphrase**—The SNMP v3 authentication password.
- **Priv Type**—The SNMP v3 privacy protocol.
- **Passphrase**—The SNMP v3 privacy password.
- **Action**—Click *Add* to add the SNMP v3 user; click *Delete* to remove the SNMP v3 user.

GROUPS

- **GroupName**—Enter a name for the group.
- **SecurityLevel**—Select a security level:
  - noAuthNoPriv—The group does not use authentication protocol and privacy protocol.
  - authNoPriv—The group is using authentication protocol, but is not using privacy protocol.
  - authPriv—The group is using authentication protocol and privacy protocol.
- **Write View**—Assigns write-access to users of this group.
- **Action**—Click *Add* to add the group; click *Delete* to remove the group.
- **Group List**—A list of the available groups that the SNMP v3 users can be assigned to.

SNMP Targets

This table is used to select the management targets for receiving notifications, as well as the type of notifications that should be sent.

- **Target ID**—The name that identifies the target.
- **IP Address**—The IP address of the target.
- **UDP port**—The UDP port number of the target.
- **SNMP user**—The SNMP user for the target.
- **Filter ID**—Assign a filter ID from the Filter List to the target.
- **Action**—Click *Add* to add an entry; click *Delete* to remove an entry.

SNMP Filter

This table is used to set filter profiles. Filter profiles are used to determine if particular management targets should receive certain notifications.

- **Filter ID**—The name used to identify the filter.
- **Filter Type**—Indicates whether or not the family of filter subtrees that are defined by this entry are included in or excluded from a filter.
- **Subtree**—The MIB subtree that defines a family of subtrees which are included in or excluded from the filter profile.
- **Action**—Click *Add* to add an entry; click *Delete* to remove an entry.

ADMINISTRATION

The Administration page allows you to perform access point management tasks as described below.

- **Change Password**—A password is required to configure the access point. Enter the user name and new password in the spaces provided and click *Apply.* It is recommended that you change the password from the default value (no password) to ensure network security.
- **Telnet and SSH Settings**—This option controls whether the console management interface is enabled. There are two protocols available for console connection:
  - **Telnet**—Sends data unencrypted over the network.
  - **SSH**—Secures the connection by encrypting the information between the access point and the user's computer.

    Both options are enabled by default.

Note: SSH connections may appear to be disabled after booting up the access point from a factory configuration for the first time. This is because the access point is generating a random key for use with SSH authentication. Wait a few minutes before trying to make SSH connections.

- **Telnet Server Enable**—Enabling this option allows connection to the access point management interface using unencrypted Telnet.
  - **SSH Server Enable**—Enabling this option allows connection to the access point management interface using encrypted SSH.
  - **SSH Port Number**—This parameter determines the port number where the access point accepts SSH connections. The default port number is 22. Enter a value between 1024 and 65535.
- **Firmware Upgrade**—You can upgrade firmware from a remote FTP or TFTP server. Select *FTP* or *TFTP.* Enter the firmware file name, the host IP address where the file is stored, the user name, and the password. Click *Start Upgrade* to start the upgrade process.
- **Backup and Restore Configurations**—Access point configurations can be saved as data files and later used to restore the access point configuration. This option lets you save access point settings in an external file or copy them from an external file to the access point. You can save an entire configuration for use as a backup to a single access point, or you can save a basic configuration, which can then be used in common by several access points in a network, providing an easy way to reconfigure all access points in a network.

  You must have a TFTP server set up on which to store the backup files.

To back up a configuration — Type the IP address of the TFTP server and a name for the backup file in the spaces provided. Click *Basic* (to save a partial configuration) or *Complete* (to save an entire configuration) and click *Backup Configuration*.

To restore a configuration — Type the IP address of the TFTP server and the name of the backup file in the spaces provided and click *Restore Configuration.* Restoring a configuration causes the access point to reset. If the file being restored was saved as a Basic configuration, only general configuration parameters such as SSID, country code, radio settings, security settings, RADIUS server settings, and management setup information are restored.

Parameters that are unique to individual access points, such as device names, IP addresses, and administration passwords, are neither affected nor overwritten.

Note: Before restoring a configuration, you can view a description of the restoration point by clicking the Restore User Comment button. Comments made at the point the backup was created will appear in the "User Comments" field. This feature allows the user to select the correct restoration point.

To restore comments — Click the Restore Comments button to view comments saved on previous backups.

- **Restore Factory Settings**—Click *Restore* to load the factory default configuration and reboot the access point. All user-configured information is lost. You must reenter the default user name (admin) to regain management access to this device.
- **Reset Access Point**—Click *Reset* to perform a hardware reset of the access point. Current configuration settings are not changed.

WDS/STP SETTINGS

The WDS/STP Settings page allows you to configure a Wireless Distribution System (WDS) link to connect 3Com access points.

WDS provides a flexible way to extend a wireless network. A Distribution System (DS) is a network (typically a wired network) that interconnects separate access points into a single LAN. With WDS, the interconnection no longer needs to be a wired medium. WDS uses the wireless medium to interconnect separate

A WDS link can be a simple, point-to-point link, a complex point-to-multipoint link, or a multilayer topology. See the *WDS Bridging and Antenna Installation Guide* that came with the access point for more details.

Configuration Guidelines

Before configuring the WDS settings, review the following guidelines:

- Only VAP1 in each radio interface can be specified to set up the WDS link. (There are two Virtual Access Points (VAPs) for each radio interface on the access point—VAP1 and VAP2. VAP1 is designated as the physical access point, and therefore, can be the only VAP specified to set up the WDS link.)
- The WDS link can be set up between 3Com access points only.
- The pair of access points to be configured with a WDS link must have the same radio channel and SSID.

Radio Bridge Roles

For each radio interface, there are three WDS roles to select from:

- **AP**—The access point behaves as a regular access point, which forwards data between the wireless clients and the wired network.
- **Bridge**—The access point behaves as a wireless bridge. The access point must have a bridge parent to which it forwards data to the Distribution System. The access point can also have bridge children, for which it acts as the bridge parent and helps to send data to the DS.
- **Root-Bridge**—The access point behaves as the "parent" of all connected WDS access points. The Root-Bridge has no bridge parents. Its Ethernet port is connected to the backbone of the wired LAN.

***Note**: A Root-Bridge can have a maximum of six child bridges assigned to it. A child bridge can have a maximum of five child bridges assigned to it.*

Bridge Address Entry

When operating in *AP* mode, bridge address entries are not available.

When operating in *Bridge* mode, the access point must be connected to a Root-Bridge and, optionally, to a maximum of five child bridges.

When operating in *Root-Bridge* mode, the access point can connect to a maximum of six child bridges, with no bridge parent.

- **Bridge Parent**—Enter the MAC address of the bridge parent. The bridge parent must have the current access point configured as a child bridge. The MAC address can be in either **`ff:ff:ff:ff:ff:ff`**, **`ff-ff-ff-ff-ff-ff`**, or **`ffffffffffff`** format.

- **Bridge Child**—Enter the MAC address of the bridge child. The bridge child must have the current access point configured as the bridge parent. The MAC address can be in either **`ff:ff:ff:ff:ff:ff`**, **`ff-ff-ff-ff-ff-ff`**, or **`ffffffffffff`** format. Leave this field blank or enter **`00-00-00-00-00-00`** if there are no bridge children to configure.

Scanning for WDS Links

For easier configuration of the WDS bridge entry, you can use the RSSI Monitor to locate nearby WDS bridges and their MAC addresses.

1. Click *Scan for WDS Links* to start the RSSI Monitor. When the RSSI Monitor appears, a list of nearby WDS bridges is displayed.
2. Select the bridge entry you want to configure from the list on the left, and a corresponding station from the list on the right.
3. Click *Copy to WDS Configuration* to copy the BSSID of the selected station to the WDS configuration window.
4. Return to the WDS Settings page and click *Apply* to save the changes.

***Note**: Only nearby 3Com Access Points models 7250, 8250, 8500, 8700, or 8750 that are running firmware versions 3.0 or later appear in the station list. Additionally, the nearby access point must be in Bridge or Root-Bridge mode.*

Configuring Spanning Tree Protocol Settings

Spanning Tree Protocol allows the access point to determine the most efficient path to forward data. It also allows network administrators to set up redundancy in the network while avoiding problems associated with network loops. This is primarily useful in a WDS environment.

Configure all parameters within the value ranges displayed.

- **Bridge**—Select *Enable* to turn on the STP feature.
- **Dynamic Entry Age-time** (1-10000 sec.)—Enter a value, in seconds, to determine the lifetime of a dynamically learned entry in the address table.
- **Bridge Priority** (1-65535)—Enter a value to determine the priority value of the bridge, which is used for STP Root Bridge election. Lower values represent higher priority. When there are two or more bridges with the same priority, their MAC addresses are used to elect the Root Bridge.
- **Bridge Max Age** (6-40 sec.)—Enter a value to determine how long the access point retains STP topology information.

- **Bridge Hello Time** (1-10 sec.)—Enter a value to determine how often the access point broadcasts the hello message.
- **Bridge Forwarding Delay** (4-30 sec.)—Enter a value to determine how long the access point remains in listening and learning states before its ports enter the forwarding state.

Link Configuration

There are two parameters for the Ethernet link and each WDS link:

- **Link Path Cost** (1-65535)—Enter a value to determine the cost of forwarding data through this link. Higher cost means the link is less efficient.
- **Link Port Priority** (0-255)—Enter a value to determine the preferred link to forward data when a network loop is detected. Lower values mean higher priority.

SYSTEM LOG

The System Log page allows you to set up a server to store event logs and to specify how the access point obtains the date and time. When you are finished configuring items on this page, click *Apply.*

Each logging message is tagged with a severity level, as defined in RFC3164. The severity levels are:

- Emergency: system is unusable
- Alert: action must be taken immediately
- Critical: critical conditions
- Error: error conditions
- Warning: warning conditions
- Notice: normal but significant condition
- Informational: informational messages
- Debug: debug-level messages

To set up a server for event logs: Select *System Log Setup Enable,* select a logging severity level from the pulldown list, enable the Logging Host and Logging Console, and enter the IP address of the server in the space provided.

To designate an SNTP server for obtaining the date and time: Select *SNTP Server Enable* and enter the IP addresses for primary and secondary SNTP servers in the spaces provided.

To use the access point as an SNTP server: Select *SNTP Server Disable,* specify time values in the spaces provided, select the time zone from the pull-down list. If you select *Enable Daylight Saving*, the time adjusts automatically for standard and daylight savings time. When the SNTP Server setting is disabled, date and time settings revert to the defaults after an access point is reset, affecting the accuracy of log reports. To avoid this situation, enable the SNTP server setting and allow the access point to obtain the date and time from an SNTP server. (The event log page displays the default time after a reset until the access point receives the correct information from the SNTP server.)

STATUS

The Status pages display additional information about the access point status and station status. View the information as described below. To return to the Advanced Setup page, click *Advanced Setup* in the left pane.

- **AP Status**—Click *AP Status* to view the access point system configuration, wireless configuration, and Virtual Access Point configuration.
- **Stations Status**—Click *Stations Status* to view the configurations of connected stations. The Station Status page displays basic connection information for all associated stations. Select "refresh" on you browser to see update station status.
- **Event Logs**—Click *Event Logs* to display the activity log of the access point. The event log resets to zero if the access point is reset. The log saves 128 events, then overwrites the first event and continues.
- **RSSI Monitor**—Click *RSSI Monitor* to search for and display parameters for each nearby access point within the radio's operating range. The access point reports back any nearby wireless LAN signal that it finds.

  For each nearby station, eight parameters are displayed:

  - **SSID**—The Service Set ID being broadcast by the station.
  - **Encryption**—Identifies if this station uses encryption to transmit data.
  - **RSSI Indicator**—A graphical representation of the signal strength, with five levels of lengths and three shades of colors:

    - Red indicates a low signal (below 20%)
    - Yellow indicates a medium signal (20% to 60%)
    - Blue represents a high signal (60% to 100%)
  - **RSSI Value**—The numerical percentage value of the signal strength. Higher percentage means a stronger signal.
  - **Operation Mode**—Displays the type of radio mode the station is operating in (11a, 11g, turbo a, turbo g).

- **Channel**—Displays the radio channel that the station is using.
- **BSSID**—The Basic Service Set Identifier of the station. This is the MAC address of the broadcasting radio.
- **STA Role**—Describes the role of a nearby 3Com access point (model 7250, 8250, 8500, 8700, or 8750) if the access point is running firmware version 3.0 or later. Possible roles are:

  -***AP***: This station is a physical interface (VAP1) of a 3Com access point and is not acting as a WDS bridge.

  -***VAP****:* This station is a virtual interface (VAP2) of a 3Com access point and is not acting as a WDS bridge.

  -***Bridge****:* This station is acting as a WDS bridge.

  -***Root Bridge****:* This station is acting as a WDS Root-Bridge.

RADIO INTERFACE

The access point radio interface detects the number of radios installed and their type (802.11g Radio or 802.11b Radio). The Radio Settings and Security options for the radio interface are described in the following sections.

RADIO SETTINGS

The Radio Settings page allows you to setup standard settings for each radio. It also allows you to enable Virtual Access Point (VAP) service, and configure the VAP settings.

VIRTUAL ACCESS POINT (VAP) CONFIGURATION

This feature allows a single access point to behave as two virtual access points. Each of these two virtual access points can form a wireless network with its own service parameters.

ENABLING VIRTUAL ACCESS POINT (VAP)

Two Virtual Access Points per radio are available. Each VAP has its own security settings. Additionally, the first VAP (VAP1) on each radio may be configured as an:

- Access Point
- Root Bridge
- Child Bridge

To enable VAP service:

1. Open the Radio Settings page for the Radio Interface you want to configure.
2. Click *Enabled* next to VAP1 to enable a single VAP.
3. Click *Enabled* next to VAP2 to enable a second VAP.

***Note**: Enabling this option turns on the Virtual Access Point. VAP 1 must be enable to enable VAP2. A disabled VAP does not accept any wireless connection.*

4. Configure the following information for each VAP:
   - **SSID**—Enter the Service Set ID (up to 32 alphanumeric characters). Clients must set their SSIDs to match the access point. The SSID is case sensitive. The two VAPs must not have the same SSID.
   - **VLAN ID**—Enter the VLAN ID number for this VLAN. This parameter determines what VLAN a client is placed in when the client attaches to this SSID. This field must not be left blank. Integer values between 1 and 4095 are accepted. If VLAN is not enabled, it is recommended to use 1. VLAN must be enabled on the access point from the Filter Control page before this setting takes effect; otherwise, this value is ignored.

     Note: If clients have VLAN IDs assigned by a RADIUS server, the RADIUS-assigned VLAN ID takes precedence over the VLAN ID configured here.
   - **Closed System**— Enabling this option prevents publicly broadcasting the SSID.
   - **Maximum Associations**—Setting this option limits the number of wireless stations that can associate to the SSID. Integer values between 1 and 64 are accepted.
   - **Authentication Timeout Interval**—This parameter determines the time interval (in minutes) before an authenticated station is removed if it never succeeds in association. Enter a time interval between 5 and 60.
   - **Association Timeout Interval**—This parameter determines the time interval (in minutes) before an associated station is removed if it has been inactive. Enter a time interval between 5 and 60.
5. Configure the radio settings for the VAP(s), following the instructions in the next section, "Changing Radio Settings".

Changing Radio Settings

To change radio settings on a VAP, select a VAP from the list to display its current configuration.

When you are finished configuring items on this page, click *Apply.*

- **Country Code**—Displays the country where this access point is installed and running.
- **Description**—Enter a description for this access point.
- **Turbo Mode (802.11g and 802.11a only)**—Turbo Mode is an enhanced wireless LAN operating mode that can provide a higher data rate.

  In normal mode the channel bandwidth is 20 MHz. In Turbo Mode the channel bandwidth is increased to 40 MHz. However, only a limited number of channels are available when Turbo Mode is enabled.
- **Auto Channel Select (802.11g only)**—Select *Auto Channel Select Enable* to allow the access point to select a radio channel automatically.
- **Radio Channel**—From the pull-down list, select the radio channel over which the access point communicates to computers in its BSS. Available channel settings are limited by local regulations that determine which channels are allowed. The client channel for wireless users is automatically set to that used by the access point to which they are linked.

  When multiple access points are deployed in the same area, be sure to choose channels separated by at least five channels to avoid channel interference. You can deploy up to three access points in the same area; for example, Ch1, Ch6, and Ch11.
- **Output Antenna**—Select the antenna to use on the access point. The access point has two antenna connectors for each radio. For the 802.11g radio, the A antenna is near the Ethernet connector and the B antenna is near the LEDs.
- **Transmission Power (802.11g only)**—Set the signal strength transmitted from the access point. The longer the transmission distance, the higher the transmission power required. (Default: 100%)
- **Maximum Transmit Data Rate**—Select the appropriate data rate from the drop-down list for the data transfer speed running on your network. (802.11b default: 11 Mbps.) In order to reach all clients, this rate should be set lower (for example, 1 or 2 Mbps on an 802.11b radio). To isolate clients that are unable to connect at higher rates, set this value higher.

- **Maximum Multicast Data Rate—**Select the appropriate maximum broadcast/multicast data rate for your network. Setting a low multicast data rate helps to ensure that data can reach all client stations. Setting a high data rate can improve performance for high-bandwidth multicast applications (for example, multimedia streaming service).
- **Beacon Interval (20-1000)**—Sets the beacon signal interval at which beacon frames are transmitted from the access point. The beacon signals allow wireless devices to maintain contact with each other. They may also carry power-management information. The Beacon Interval unit is TU, which corresponds to 1024 microseconds. (Default: 100 TU)
- **Data Beacon Rate (DTIM) (1-255)**—Determines how often the beacon signal contains a delivery traffic indication message(DTIM). This tells client devices that are in power-saving mode that a packet is waiting for them.
- **Fragment Length (256-2346) (802.11g only)**—The Fragment Length can be set between 256 and 2,346. If the packet size is smaller than the preset fragment size, the packet will not be segmented.

  Fragmentation of the PDUs (Package Data Unit) can increase the reliability of transmissions because it increases the probability of a successful transmission due to smaller frame size. If there is significant interference present, or collisions due to high network utilization, try setting the fragment size to send smaller fragments. This will speed up the retransmission of smaller frames. However, it is more efficient to set the fragment size larger if very little or no interference is present because it requires overhead to send multiple frames. (Default: 2346)
- **RTS Threshold (0-2347)**—Set the RTS (Request to Send) frame length. You may configure the access point to initiate an RTS frame sequence always, never, or only on frames longer than a specified length. If the packet size is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled.

  The access point sends RTS frames to a particular receiving station to negotiate the sending of a data frame. After receiving an RTS frame, the station sends a CTS (Clear to Send) frame to acknowledge the right of the sending station to send data frames.

  The access points contending for the medium may not be aware of each other. The RTS/CTS mechanism can solve this hidden node problem. (Default: 2346)
- **Preamble Length (802.11g and 802.11b only)**—IEEE 802.11 frames begin with an alternating pattern of 1s and 0s called the preamble, which tells receiving stations that a frame is arriving. This provides time for the receiving station to synchronize to the incoming data stream. Enabling the Short preamble can boost your throughput; however, this can cause interoperability issues. (Default: Long)

SECURITY

The Security page allows you to set up lower-layer client authentication and data encryption parameters as described below.

***Note**: Because of limitations in the Virtual Access Point feature, VAPs on the same physical interface share the same WEP keys; therefore, the WEP configuration section applies to both VAPs.*

When you are finished configuring items on this page, click *Apply.*

SELECTING A VIRTUAL ACCESS POINT (VAP)

Open the **Virtual AP** drop-down box and select the VAP you want to configure. Each VAP has its own set of security parameters except for the WEP key table, which is shared between two VAPs.

CONFIGURING AUTHENTICATION

The following types of authentication can be configured:

- **Open System** (the default)—Allows access to everyone.
- **Shared Key**—If Shared Key is enabled, Encryption must also be enabled as described in "Configuring Encryption" on page 54.

CONFIGURING ENCRYPTION

The following types of data encryption are available:

- WPA—Wi-Fi Protected Access.
- WEP—Wired Equivalent Privacy

The access point and the wireless devices must have the same encryption settings to communicate. You can choose to allow only clients using WPA encryption, or you can allow both WPA and WEP clients.

The following sections describe how to configure each type of encryption. When you are finished configuring the encryption, click *Apply.*

WPA Configuration

To configure WPA encryption:

1 Choose open system, and then click the *Required* check box on the authentication page if you want to limit access to clients using WPA encryption. If you also want to allow WEP clients, do not check this box.

2 Select the Cipher Mode, which determines the method by which keys are computed. WEP is the weakest Multicast Cipher Mode and is only provided for support of legacy clients which do not fully support WPA. Clients associated with WPA-TKIP will have unicast packets directed at them with corresponding encryption keys. However, with WEP selected as the Cipher Mode, ALL multicast traffic is sent out with WEP encryption. It is recommended to only select WEP as the Cipher Mode if legacy client support is critical.

AES - Advanced Encryption Standard (Highest Security)

TKIP—(Temporal Key Integrity Protocol) provides per-packet key mixing, a message integrity check and a re-keying mechanism

WEP—Provides standard WEP ciphering (Least Secure)

3 Select the type of WPA Key Management:

WPA authentication over 802.1x (More secure, but requires a RADIUS authentication server setup. **See WPA note below**)

WPA Pre-shared Key (PSK) (**see WPA note below**)

4 Select the Key Type:

Hexadecimal (0~9, A~F; for example, D7 0A 9C 7F E5)

ASCII (0~9, A~F; for example 01234)

5 Enter the pre-shared key in the space provided if necessary.

WPA Note:

The WPA key management must match the settings on the Authentication Page. When using 802.1x, the access point uses session keys provided during the 802.1x EAP key exchange as the "seed key" for WPA. This is more secure than PSK, since each client starts with a unique session key for all subsequent keys generated. Otherwise, the PSK is used for the "seed key".

The 802.1x Wireless Setup on the Authentication Page should be set as follows:

- If only one Radio is installed, and "WPA pre-shared key (PSK)" is selected on the security page, then the 802.1x Wireless Setup can be either "Disabled" or "Supported" on the Authentication Page.

- If only one Radio is installed and "WPA authentication over 802.1x" is selected on the security page, then 802.1x Wireless Setup must be either "Supported" or "Required" on the Authentication Page.
- If two Radios are installed and WPA is being used with "WPA authentication over 802.1x" selected for both radios' WPA key management, then set the 802.1x Wireless Setup to "Required" on the Authentication Page.
- If one radio's security is set to "WPA pre-shared key (PSK)" for WPA key management and the other is set to "WPA authentication over 802.1x", then the 802.1x Wireless Setup must be set to "Supported" on the Authentication Page instead.

WEP Configuration

WEP encryption is based on the use of security keys and the popular RC4 encryption algorithm.

At least one transmit key must be defined in the WEP Configuration. Wireless devices without a valid WEP key will be excluded from network traffic.

The key selected as the transmit key index is used by the access point for all transmissions. Other keys defined can be used by the access point for decrypting station communications. When enabling 802.1x security with dynamic session keys, key index 4 is reserved for the 802.1x client session key. Therefore, when 802.1x clients are in the network, the access point should not be configured to use key index 4 as the transmit key index.

To configure WEP encryption:

1 Under Encryption, select *Enable*.

2 Under WEP Configuration, select the Key Size.

The access point supports shared key encryption with key lengths of 64-bits, 128-bits, or 152-bits.

3 Select the Key Type.

Hexadecimal (0~9, A~F; for example, D7 0A 9C 7F E5)

ASCII (0~9, A~F; for example 01234)

3Com Passphrase(a string, described below)

4 Enter the keys in their fields.

64-bit—Each key contains 10 hexadecimal digits or 5 alphanumeric characters.

128-bit—Each key contains 26 hexadecimal digits or 13 alphanumeric characters.

152-bit—Each key contains 32 hexadecimal digits or 16 alphanumeric characters.

3Com Passphrase—This encryption string is for use only with other 3Com Wireless LAN devices. It is a case-sensitive string between 6 and 30 characters long. To enter the string, click *3Com Passphrase.* Then type any combination of letters and numbers in the Key 1 field and click *Apply.*

5 Uncheck box under WPA Configuration

6 Choose the WEP option under Multicast Cipher Mode.

How to setup the access point for RADIUS authentication

1 Using the Wireless Infrastructure Device Manger access the configuration screen for the AP7250.

2 Enter your User Name and Password and click LOGIN (Default: admin with no password).

3 Select **Advanced Setup.**

4 Click on **RADIUS** from the left frame page Menu.

5 Enter all the settings of your Primary RADIUS Authentication Server (make sure the IP Address and Key match those on the RADIUS Authentication software).

6 Click on **Apply.**

7 Choose **Authentication** from the left frame page Menu.

8 Make sure the following settings are set on the Authentication page:

- **a** **MAC Authentication** is Disabled. (if Local or RADIUS MAC Authentication is chosen MAC address filtering or authentication, respectively, will be done before the 802.1x authentication. Therefore, these setups must be validated individually and verified functional before 802.1x can be done).
- **b** **802.1x Wireless Setup:** is set to Supported (if non-RADIUS clients need access too) or Required (if only RADIUS clients are to be allowed).
- **c** Click on *Apply.*

9 Click *Security* on the 802.11b/g radio from the left frame page Menu.

10 Make sure the following settings are set from the Security page:

- **a** Authentication is set to *Open System.*
- **b** Encryption is *Enabled.*
- **c** WPA Configuration Required "Allow only WPA Clients" is left unchecked.

d Cipher Mode is set to *WEP*.

e WEP Configuration has at least one valid WEP key.

f Click on *Apply*.

11 The Access Point is now configured for RADIUS Authentication.

How to setup the access point for WPA with 802.1x Session keys

1 Using the Wireless Infrastructure Device Manger access the configuration screen for the AP7250.

2 Enter your User Name and Password and click LOGIN (Default: admin with no password).

3 Select **Advanced Setup.**

4 Click on **RADIUS** from the left frame page Menu.

5 Enter all the settings of your Primary RADIUS Authentication Server (make sure the IP Address and Key match those on the RADIUS Authentication software).

6 Click on **Apply.**

7 Choose **Authentication** from the left frame page Menu.

8 Make sure the following settings are set on the Authentication page:

a **MAC Authentication** is Disabled. (if Local or RADIUS MAC Authentication is chosen MAC address filtering or authentication, respectively, will be done before the 802.1x authentication. Therefore, these setups must be validated individually and verified functional before 802.1x can be done).

b **802.1x Wireless Setup:** is set to Supported (if non-RADIUS clients need access too) or Required (if only RADIUS clients are to be allowed).

c Click on Apply.

9 Click **Security** on the 802.11b/g radio from the left frame page Menu.

10 Make sure the following settings are set from the Security page:

a Authentication is set to *Open System*.

b Encryption is *Enabled*.

c WPA Configuration is Checked to "Allow only WPA Clients".

d Cipher Mode is set to *AES/TKIP/WEP* (WEP Cipher Mode is intended ONLY for support of legacy clients. If only WPA clients are on the network, choose AES or TKIP for increased security).

e WEP Configuration has at least one valid WEP key.

f WPA Key Management set to *WPA Authentication over 802.1x*.

g Click on *Apply*.

11 The Access Point is now configured for WPA Authentication over 802.1x.

How to setup the access point for WPA with Pre-Shared (PSK) Key

1 Using the Wireless Infrastructure Device Manger access the configuration screen for the AP7250.

2 Enter your User Name and Password and click LOGIN (Default: admin with no password)

3 Select **Advanced Setup.**

4 Choose **Authentication** from the left frame page Menu

5 Make sure the following settings are set on the Authentication page:

a **MAC Authentication** is Disabled. (if Local or RADIUS MAC Authentication is chosen MAC address filtering or authentication, respectively, will be done before the 802.1x authentication. Therefore, these setups must be validated individually and verified functional before 802.1x can be done).

b **802.1x Wireless Setup:** is set to Disabled or Optional (if RADIUS clients need access too).

c Click on **Apply**.

6 Click **Security** on the 802.11b/g radio from the left frame page Menu.

7 Make sure the following settings are set from the Security page:

a Authentication is set to *Open System*.

b Encryption is *Enabled*.

c WPA Configuration is Checked to "*Allow only WPA Clients*".

d Cipher Mode is set to *AES/TKIP/WEP* (WEP Cipher Mode is intended ONLY for support of legacy clients. If only WPA clients are on the network, choose AES or TKIP for increased security).

e WEP Configuration has at least one valid WEP key (select the appropriate key length, key type, and key index).

f WPA Key Management select *WPA Pre-shared Key (PSK) and Key Type*.

g Enter the WPA PSK

h Click on *Apply*.

8 The access point is now configured for WPA Pre-shared Key.

WPA Configuration for Windows XP

The following table shows how to configure the access point to support the various authentication and encryption options available for Windows XP Wireless Zero Configuration.

The following notes apply to configuring the access point for WPA under Windows XP:

- A WPA-capable wireless network interface card is required.
- The Windows XP Support Patch for Wireless Protected Access, which you can download from the Microsoft Web site, is required.
- To allow WEP clients, clear the WPA Configuration Required check box and enter an appropriate WEP key.
- For all WPA configurations, 802.1x must be enabled on the Authentication page.

Windows XP Wireless Zero Configuration		**Access Points 8250/8750**		
Authentication	**Encryption**	**Authentication**	**Encryption**	**Other**
Open	Disabled	Open System	Disable	
	WEP	Open System	Enable	Enter static keys under WEP Configuration
Shared	Disabled	Not available		
	WEP	Shared Key	Enable	Enter static keys under WEP Configuration
WPA	AES	Not available on 8200		
	TKIP	Open System (for 8750)	Enable	WPA Configuration: Required Multicast Cipher Mode: AES WPA Key Management: WPA 802.1x
	WEP	Open System	Enable	WPA Configuration: Required Multicast Cipher Mode: WEP WPA Key Management: WPA 802.1x

Windows XP Wireless Zero Configuration		Access Points 8250/8750		
Authentication	**Encryption**	**Authentication**	**Encryption**	**Other**
WPA-PSK	AES	Not available on 8200		
		Open System (for 8750)	Enable	WPA Configuration: Required Multicast Cipher Mode: AES WPA Key Management: WPA 802.1x
	TKIP	Open System	Enable	WPA Configuration: Required Multicast Cipher Mode: TKIP WPA Key Management: WPA-PSK Select Key Type and enter Pre-Shared Key
	WEP	Open System	Enable	WPA Configuration: Required Multicast Cipher Mode: WEP WPA Key Management: WPA-PSK Select Key Type and enter Pre-Shared Key

4 TROUBLESHOOTING

If you have difficulty with the 3Com Wireless LAN access point, first check the following items in the configuration:

- Radio Settings page: Ensure that the SSID is the same on clients and the access point.
- Security page: Ensure that Encryption is the same on clients and the access point.
- Authentication page: Ensure that the Local MAC Authentication System Default is set to Allow. Ensure that 802.1x Authentication Settings are correct.
- TCP/IP Settings page: If the DHCP Client is set to Disabled, then ensure that the access point IP Address is within the same subnet as the wired LAN.

If necessary, reset the access point to the factory defaults.

Try the solutions in the following table. If you need further assistance, contact 3Com Technical Support through the following Web page: http://www.3com.com/products/en_US/supportedindex.jsp

Symptom	Solutions
Access point does not power up.	Make sure the Ethernet cable is plugged into the port labeled *To Access Point* on the power brick. Check for a faulty access point power supply. Check for a failed AC power supply
Access point powers up, but has no connection to the wired network.	Make sure that the Ethernet cable is plugged into the port labeled To Hub/Switch on the power brick. Verify the network wiring and topology for proper configuration. Check that the cables used are the proper type.

Symptom	Solutions
No operation.	Verify the access point configuration. Review access point firmware revisions and update firmware if necessary. Make sure that there are no duplicate IP addresses on the network. Unplug the access point and ping the assigned address to make sure that no other device responds to that address.
Access point powers up, but does not associate with wireless clients.	Confirm that the service area on the access point matches that on the clients. Verify that the clients are operating correctly. Make sure that security settings on the access point match those on the clients. Make sure that the access point antennas are positioned properly. Check the range and move clients closer if necessary.
Mobile users do not have roaming access to the access point.	Make sure that all access points and wireless devices in the ESS in which mobile users can roam are configured to the same WEP setting, SSID, and authentication settings.
Slow or erratic performance.	Try changing the wireless channel on the access point. Check the access point antennas, connectors, and cabling for loose connections. Check the wired network topology and configuration for malfunctions.
Running on a computer connected to the wired LAN, the 3Com Device Manager cannot find an access point.	The 3Com Device Manager cannot discover devices across routers. Make sure that the computer is connected on the same segment as the access point.
After you specify an IP address for an access point, the 3Com Device Manager continues to point to the old IP address when you select the access point in the Wireless Network Tree.	In the 3Com Device Manager window click the *Refresh* button to refresh the Wireless Network Tree. Then click the access point in the Wireless Network Tree and click *Properties*. The IP address you specified is now listed. If you want to continue configuring the access point, click *Configure*.

Symptom	Solutions
While you are configuring the access point, the Configuration Management System stops responding.	To maintain wireless association, the service area and the security settings on the client and the access point must match exactly. Therefore, if you are associated with the access point that you are configuring and you change the access point service area or security, make sure to change the client service area to match. If you change the IP address and save the change, you cannot continue to configure the access point using the old IP address. Therefore, if you want to continue configuring this access point after you save this change, you must do the following: **1** Close your browser. **2** Return to the 3Com Device Manager Wireless Network Tree and click *Refresh*. **3** Select the access point and click *Configure* to start a new configuration session.
The access point cannot be configured using the Web browser.	Reset the access point (push the reset button located near the access point LEDs).

REGULATORY COMPLIANCE INFORMATION

3Com Wireless LAN Access Point 7250 (Model WL-455, incorporating WL-463 radio module)

General

The 3Com Wireless LAN Access Point 7250 (3CRWE725075) must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

This product contains encryption. It is unlawful to export out of the U.S. without obtaining a U.S. Export License.

This product does not contain any user serviceable components. Any unauthorized product changes or modifications will invalidate 3Com's warranty and all applicable regulatory certifications and approvals.

Only antennas specified for your region by 3Com can be used with this product. The use of external amplifiers or non-3Com antennas may invalidate regulatory certifications and approvals.

This product must be installed by a professional technician/installer.

Caution: Exposure to Radio Frequency Radiation

This device generates and radiates radio-frequency energy. In order to comply with FCC radio-frequency exposure guidelines for an uncontrolled environment, this equipment must be installed and operated while maintaining a minimum body to antenna distance of 20 cm (approximately 8 in.).

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.

This product must maintain a minimum body to antenna distance of 20 cm. Under these conditions this product will meet the Basic Restriction limits of 1999/519/EC [Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)].

US - Radio Frequency Requirements

This device must not be co-located or operated in conjunction with any other antenna or transmitter.

US Federal Communications Commission (FCC) EMC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet prepared by the Federal Communications Commission helpful:

The Interference Handbook

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 004-000-0034504.

3Com is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this 3Com Wireless LAN Access Point 7250 (3CRWE725075), or the substitution or attachment of connecting cables and equipment other than specified by 3Com.

The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

Changes or modifications not expressly approved by 3Com could void the user's authority to operate this equipment.

US Manufacturer's FCC Declaration of Conformity

3Com Corporation
350 Campus Drive
Marlborough, MA 01752-3064, USA
(508) 323-5000
Date: 1 February 2005

Declares that the Product:
Brand Name: 3Com Corporation
Model Number: WL-455
Equipment Type: Wireless LAN Access Point

Complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

3Com Wireless LAN Access Point 7250
Model WL-455

Industry Canada - RF Compliance

This device complies with RSS 210 of Industry Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.

L ' utilisation de ce dispositif est autorisée seulement aux conditions suivantes: (1) il ne doit pas produire de brouillage et (2) l' utilisateur du dispositif doit étre prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication. To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

Pour empecher que cet appareil cause du brouillage au service faisant l'objet d'une licence, il doit etre utilize a l'interieur et devrait etre place loin des fenetres afin de Fournier un ecram de blindage maximal. Si le matriel (ou son antenne d'emission) est installe a l'exterieur, il doit faire l'objet d'une licence.

Industry Canada - Emissions Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de Conformité à la Réglementation d'Industrie Canada

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

Safety Compliance Notice

This device has been tested and certified according to the following safety standards and is intended for use only in Information Technology Equipment which has been tested to these or other equivalent standards:

- UL Standard 60950 (3rd Edition)
- CAN/CSA C22.2 No. 60950-00
- IEC 60950
- EN 60950

EU Compliance

CE0560 !

This equipment may be operated in							
AT	BE	CY	CZ	DK	EE	FI	FR
DE	GR	HU	IE	IT	LV	LT	LU
MT	NL	PL	PT	SK	SI	ES	SE
GB	IS	LI	NO	CH	BG	RO	TR

Intended use: IEEE 802.11b/g radio LAN device

NOTE: To ensure product operation is in compliance with local regulations, select the country in which the product is installed. Refer to "Setting the Country Code" in the chapter System Configuration.

English	Hereby, 3Com Corporation, declares that this RLAN device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Finnish	3Com Corporation vakuuttaa täten että RLAN device tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Dutch	Hierbij verklaart 3Com Corporation dat het toestel RLAN device in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG Bij deze verklaart 3Com Corporation dat deze RLAN device voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.
French	Par la présente 3Com Corporation déclare que l'appareil RLAN device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE Par la présente, 3Com Corporation déclare que ce RLAN device est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables.
Swedish	Härmed intygar 3Com Corporation att denna RLAN device står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Danish	Undertegnede 3Com Corporation erklærer herved, at følgende udstyr RLAN device overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

German	Hiermit erklärt 3Com Corporation, dass sich dieser/diese/dieses Managed Accces Point in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet". (BMWi) Hiermit erklärt 3Com Corporation die Übereinstimmung des Gerätes RLAN device mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG. (Wien).
Greek	*ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ 3Com Corporation ΔΗΛΩΝΕΙ ΟΤΙ RLAN device ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ*
Italian	Con la presente 3Com Corporation dichiara che questo RLAN device è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Spanish	Por medio de la presente 3Com Corporation declara que el RLAN device cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Portuguese	3Com Corporation declara que este RLAN device está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Malti	Hawnhekk, *3Com Corporation*, jiddikjara li dan *RLAN device* jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC
Estonian	Käesolevaga kinnitab 3Com Corporation seadme RLAN device vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
Hungarian	Alulírott, 3Com Corporation nyilatkozom, hogy a RLAN device megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Slovak	*3Com Corporation* týmto vyhlasuje, že *RLAN device* spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Czech	*3Com Corporation* tímto prohlašuje, že tento *RLAN device* je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Slovene	Siuo *3Com Corporation* deklaruoja, kad šis *RLAN device* atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Lithuanian	Siuo *3Com Corporation* deklaruoja, kad šis *RLAN device* atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Latvian	Ar šo *3Com Corporation* deklarē, ka *RLAN device* atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.

A copy of the signed Declaration of Conformity can be downloaded from the Product Support web page for the 3Com Wireless LAN Access Point 7250 (3CRWE725075) at http://www.3com.com.

Also available at http://support.3com.com/doc/AP7250_WL-463.pdf

EU - Restrictions for Use in the 2.4GHz band

This device may be operated indoors or outdoors in all countries of the European Community using the 2.4GHz band: Channels 1 - 13, except where noted below.

- In Italy the end-user must apply for a license from the national spectrum authority to operate this device outdoors.
- In Belgium outdoor operation is only permitted using the 2.46 - 2.4835 GHz band: Channel 13.
- In France outdoor operation is only permitted using the 2.4 - 2.454 GHz band: Channels 1 - 7.

Brazil RF Compliance

Este equipamento opera em car·ter secund·rio, isto È, nao tem direito a proteÁao contra interferencia prejudicial, mesmo de estaÁoes do mesmo tipo, e nao causar interferencia a sistema operando em car·ter prim·rio.

INDEX

Numbers

3Com 3CDaemon Server Tool 23
3Com Network Supervisor 23
3Com Passphrase encryption 57
3Com Wireless Infrastructure Device Manager 23, 25
802.11a, turbo mode 52
802.1x reauthentication refresh rate 34
802.1x setup 33

A

access point
  installation 11
  IP address, troubleshooting 64
  resetting 45
accounting 32
ad hoc 5
adapter, choosing 26
administration 44
administration tool 25
advanced setup 29
antenna 15, 21
  comparison data 21
  options 21
  standard detachable (Access Point 8200) 15
AP management filter 37
AP status 49
authentication 33, 54
  local MAC 35
  MAC 33
  open system 54
  RADIUS MAC 34
  shared key 54
automatic channel selection 52

B

backup configuration 44
basic configuration 28
beacon interval 53
broadcast key refresh rate 34

C

cable 11
change password 44
channel 52
choosing a NIC 26
community name 39
configuration 25
  advanced 29
  basic 28
  login 27
Configuration Management System 26, 27
configuration, backup and restore 44
Configure button 26
configuring encryption 54
connecting
  power 12, 16
contact 39
country code 27

D

data
  encryption 54
  transfer speed 52
date and time settings 48, 49
default
  gateway 29
device
  configuring 26, 27
device manager 25
  launching 25
DHCP client 29

E

encryption
  3Com Passphrase 57
  configuring 54
  shared key 56
  WEP 54, 56
  WPA 54, 55
Ethernet Broadcast Storm Control 37

Ethernet cable 11
Ethernet type filter 38
event logs 49

F

filter control 36
firmware upgrade 44
flat surface installation 20
fragment length 53

G

gateway, default 29
glossary of wireless networking terms 7

I

identification 29
IEEE 802.3af power-over-Ethernet 16
infrastructure configuration 5
installation 11
  access point 11
  antenna 15
  cable 11
  flat surface 20
  location 13
  power 12
  requirements 11
  software utilities 23, 24
  wall mount 18
IP address 29
  refreshing after changing 26
  troubleshooting 64

L

launching the device manager 25
LEDs 18
local bridge filter 37
local MAC authentication 35
locating
  devices 25, 26
  MAC address 35
location
  configuration parameter 39
  for installation 13
log 48
login 27

M

MAC address
  locating 35
  recording 14
  use in locating devices 25, 26
MAC authentication 33
management VLAN ID 36
maximum station data rate 52
mounting
  on a wall 18
  plate 19

N

network configuration and planning 5
NIC, choosing 26

O

open system 54

P

passphrase 57
password 44
planning a network 5
power 12
  connecting 16
  requirements 12
  supply, 3Com integrated 16, 17
power-over-Ethernet 16
preamble 53
Pre-IP Configuration Wizard 26, 27
Properties button 26

R

radio channel 52
radio interface 50
RADIUS
  accounting 32
RADIUS Authentication Setup Steps 57
RADIUS MAC authentication 34
reauthentication refresh rate 34
recording MAC address 14
Refresh button 26
resetting the access point 45
restore configuration 44
RF preamble 53
roaming 6

RTS threshold 53

S

safety information 12
secure web server connection 30
session key refresh rate 34
setting the time and date 48, 49
settings
    TCP/IP 29
Setup Wizard 28
setup, 802.1x 33
shared key 54
shared key encryption 56
Simple Network Management Protocol (SNMP) 39
software utilities, installing 23, 24
SSID 49, 51
stations status 49
statistics, accounting 32
status 49
subnet mask 29
system configuration 25
system log 48

T

TCP/IP settings 29
terminology 7
time and date settings 48, 49
transmission power 52
trap destination 39
troubleshooting 63
turbo mode 52

U

upgrading firmware 44

V

VLAN 36
VLAN ID 36

W

wall mount installation 18
web server, secure connection 30
WEP 54, 56
Windows XP Wireless Zero Configuration 60
wireless network tree 25
WPA 54, 55